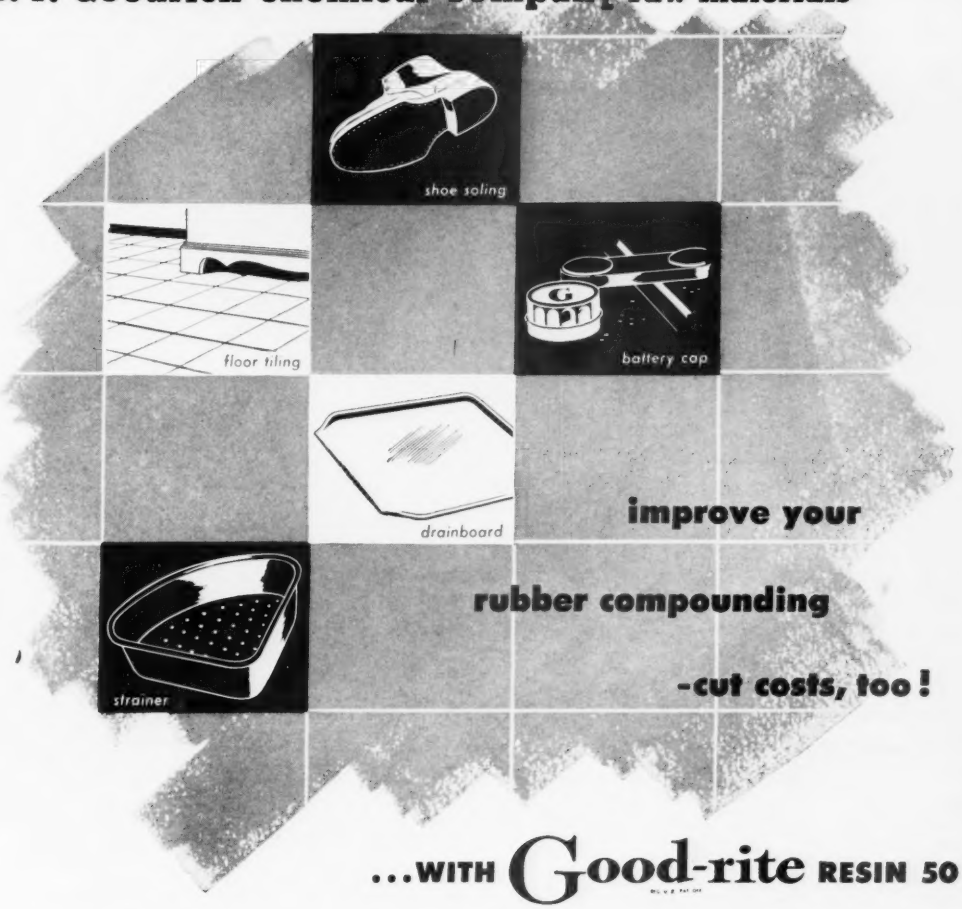
News about

B. F. Goodrich Chemical Company *raw materials*



...WITH Good-rite RESIN 50

GOOD-RITE Resin 50 is an easy-processing reinforcing agent with advantages that cut rubber compounding costs—and improve finished products.

It affords a new and simple compounding approach to hardness problems. For example, it's a means of filling in the gap between soft rubber compounds and ebonites.

More advantages! It saves time by eliminating masterbatching. It gives rubber compounds better flex life . . . higher elongation . . . improved abrasion resistance . . . and easier handling because Resin 50 acts as a plasticizer at processing temperatures.

In extruding gaskets, tubing, coving, etc. —especially on hard compounds—Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Good-rite Resin 50 is a white, free-flowing powder. It can be compounded in a wide range of attractive colors. Send for technical bulletins. Find out how Good-rite Resin 50 improves rubber compounding, cuts costs too. Please address Dept. CA-4, B.F.Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company

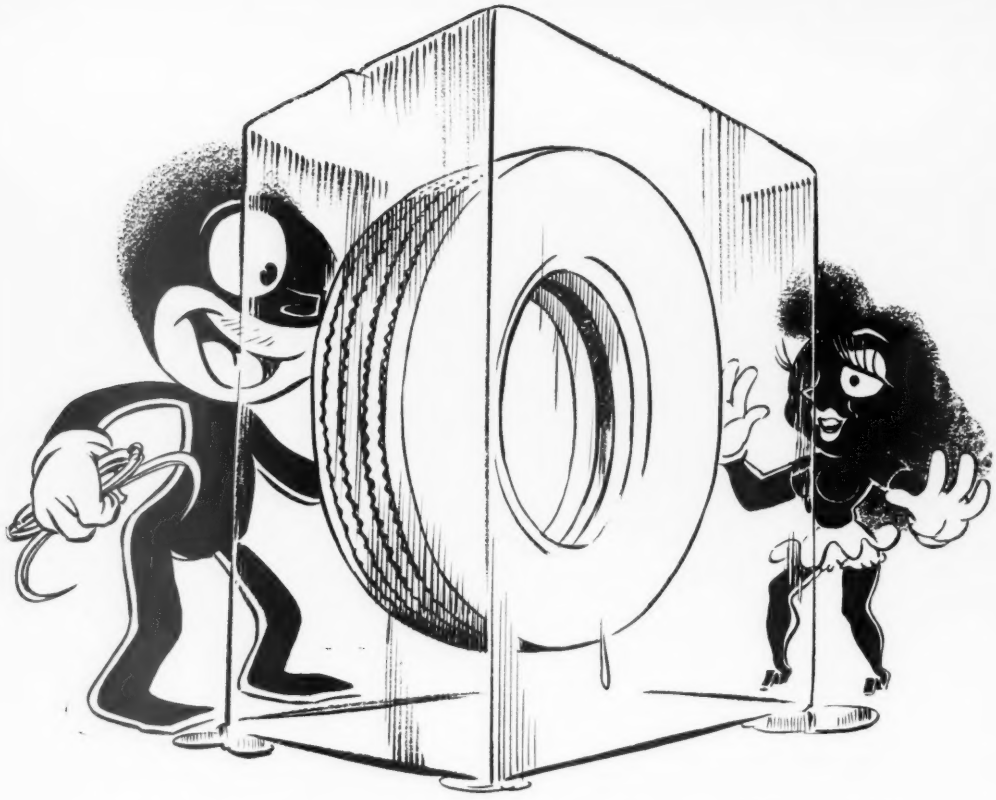
A Division of The B. F. Goodrich Company

Hycar

Reg. U.S. Pat. Off.

American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



Tire makers know a trick that's neat
Use **Philblack*** **A** *to disperse heat!*

● Got a temperature problem? Keep cool! Philblack A helps tire manufacturers keep their blood pressure down by dispersing heat in heavy duty tires . . . by helping to prevent dangerous heat buildup.

Other advantages: easy processing . . . smooth, fast tubing . . . good physical characteristics . . . low cost! Philblack A is being used with outstanding success in carcass stocks for heavy duty tires, in inner tubes and in many other kinds of mechanical rubber goods.

The Philblack Sales Service Laboratory, in downtown Akron, is staffed and equipped to analyze your compounding needs. Avail yourself of this service through the Philblack technical sales representative who calls on you.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

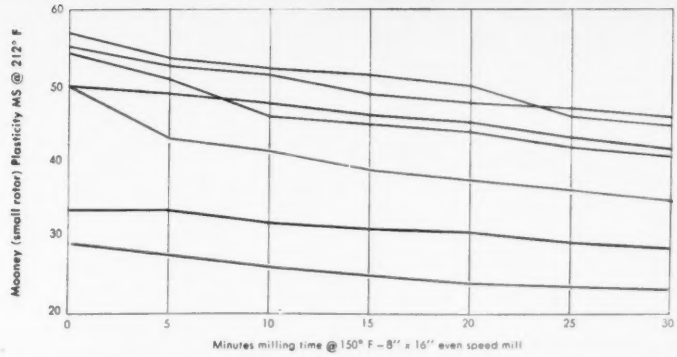
EVANS BUILDING • AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION • 80 BROADWAY • NEW YORK 5, N. Y.

* A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

MILL BREAKDOWN—CHEMIGUM VS. NITRILE RUBBERS



NITRILE RUBBER	Parts Acrylonitrile
Rubber E	45
Rubber D	30
Rubber C	45
Rubber B easy processing	30
CHEMIGUM N3	45
Rubber A	26
CHEMIGUM N4	30

Here's Proof—

THE EASIEST PROCESSING NITRILE YOU CAN BUY IS CHEMIGUM

POUND for pound of acrylonitrile content, no other nitrile rubber is easier to process on the mill or in the banbury than CHEMIGUM! The chart you see here shows that Goodyear's use-proved CHEMIGUM gives you easier process on a hot mill —softening gradually with prolonged mastication rather than toughening.

And this easier processing is obtained without loss of physical or chemical properties — compression set, water absorption and brittle point are low, while oil and solvent resistance, tensile strength, elongation, modulus and crescent tear are all characteristically high.

In either light or dark products—wherever oil or solvent resistance is a requirement—it will pay you to use CHEMIGUM. Ask a Goodyear Chemical Division Representative for details, or write:

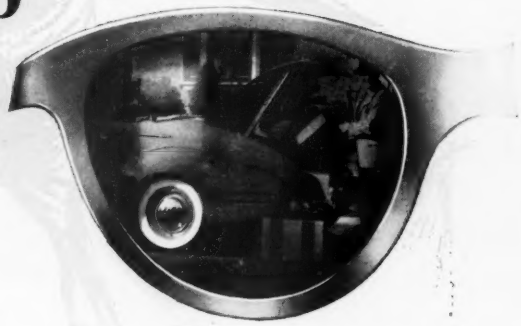
Goodyear Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic –T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS —The Finest Chemicals for Industry

Titanox-for GOOD LOOKS in WHITE WALLS



White sidewalls pigmented with Titanox titanium dioxide pigments are the cleanest, brightest white you've ever seen and they stay that way. Titanox pigments can contribute more to white sidewalls than just good looks. Indications are that Titanox "non-chalking" rutile pigments—especially TITANOX-RA-NC—fortify white walls against crazing, chalking and checking... help maintain the even, brilliant original white of new tires.

Physically and chemically stable, Titanox titanium dioxide pigments are compatible with natural and synthetic rubbers, as well as compounding ingredients. Our Technical Service Department is ready at any time to help you choose the best Titanox pigments for your rubber formulations. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

1158

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

Rubber needs

WING-STAY S

for this triple protection

ANYTHING made of rubber needs protection against oxidation, sunlight, aging, and excessive heat. White and light-colored products particularly need protection.

Choice of the rubber industry to protect these items is WING-STAY S produced by Goodyear's Chemical Division. For WING-STAY S keeps colors clean-looking, will not migrate to the surface or into adjoining products, is non-staining and gives positive protection.

Since August 1951, more nonstaining synthetic rubber, including GRS-1006 and GRS-1502, has been made with WING-STAY S than with all other anti-oxidants combined.

By using WING-STAY S, you will secure the best possible balance—in natural or synthetic rubber—between preservative properties, nondiscoloring and nonstaining properties and low cost. For details, write,

Goodyear, Chemical Division, Akron 16, Ohio

Chemigum, Pliobond, Pliolite, Pliovic, Wing-Stay—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

Such confidence must be deserved!

Skellysolve for Rubber and Related Industries

Applications

SKELLYSOLVE B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound. Closed cup flash point about −20°F.

SKELLYSOLVE C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve B. Closed cup flash point about 13°F.

SKELLYSOLVE D. For cements and variety of manufacturing operations. Good odor. Quick drying. Minimum of heavy, greasy compounds. Closed cup flash point about 3°F.

SKELLYSOLVE H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve D is desired. Closed cup flash point about −20°F.

SKELLYSOLVE V. For use wherever a relatively slow drying solvent is desired. Closed cup flash point about 50°F.

SKELLYSOLVE R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about −25°F.

"DOC" MacGEE SAYS: Rubber product manufacturers who use Skellysolve have one thing in common—an implicit feeling of confidence with regard to their source of solvent supply. And with good reason! From the pioneering days of over 20 years ago right up to the present, Skellysolve customers have had but precious little to worry about their supply of solvents.

Quality-wise you can put your confidence in Skellysolve. It's always uniform. Every batch has the same over-all properties you need to protect the quality of your product. You can bank on Skellysolve's low end points, quick evaporation, low vapor pressure, and its minimum of unsaturates as well as pyrogenic decomposition products. There's a minimum of both low and high boiling compounds . . . to reduce rejects caused by blushing and blisters.

Controlled vapor pressure guards against bloated containers. Low boiling compounds are kept at the barest minimum to prevent "seeds" in rubber cements; high bonding strength is assured by freedom from greasy residues.

Quantity-wise you can count on Skellysolve. Your supply is supported by a network of strategically located refineries, bulk plants and the "will-to-do." And we offer alternate methods of delivery to cope with any emergency.

Want help on special solvent problems? Call on our Skellysolve Technical Fieldman.

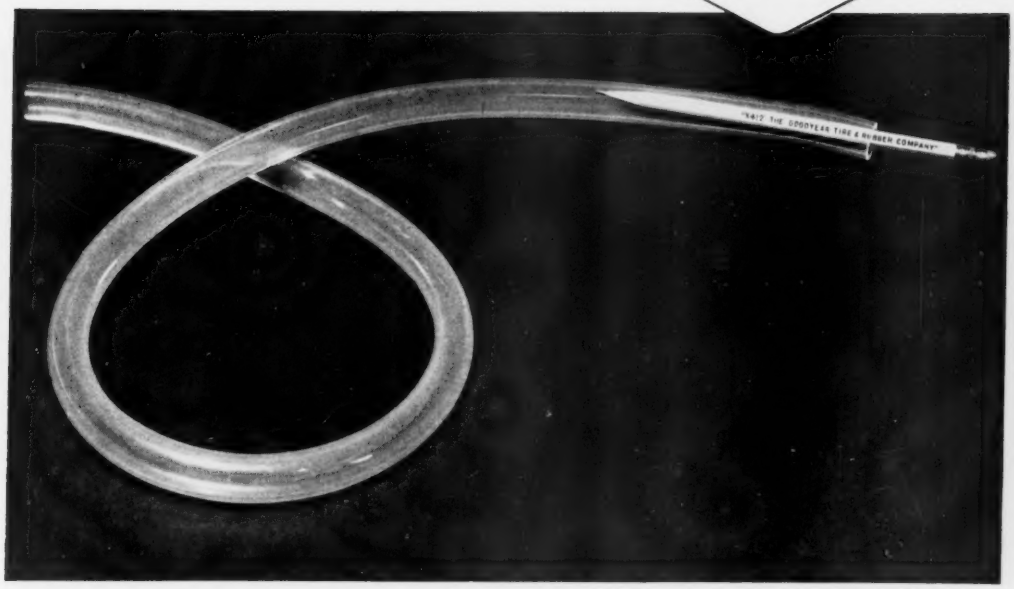
SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI

CLEAR PROOF

—YOU'LL DO BETTER WITH PLIOVIC



Outstanding clarity and flexibility mark this extruded vinyl hose made with PLIOVIC—*Goodyear's use-proved vinyl resin.*

EVEN in extruded hose or tubing, you can get clarity without loss of strength, flexibility or gloss when you use one of the new PLIOVIC resins. And you can extrude directly from the pre-mix with this use-proved Goodyear vinyl resin—eliminating time-wasting mill mixing. Whatever your manufacturing method may be, you can use PLIOVIC—and process more easily at lower temperatures.

Rigid or pliable, clear or opaque, PLIOVIC products have outstanding chemical resistance, heat and light stability and excellent physical properties. So look to PLIOVIC for new applications using vinyl resins and latices.

For details and samples, see a Goodyear Chemical Division Representative, or write:

Goodyear, Chemical Division, Akron 16, Ohio

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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SOLKA®-FLOC D

THE *NEW* DUSTING AGENT!

- Low gravity for economy.
- Ultra fine for easy application.
- Non-toxic for safety.
- Non-abrasive for thread, tubes, film, apparel, etc.
- Affords greater plant cleanliness.
- Does not interfere with knitting in the mold.
- Absorbed into the surface during molding.
- Does not soften—or streak.
- No build-up in the mold.
- Improves cementability in soling, sponge, etc.
- Intermediately priced for replacing zinc stearate and talc.
- Prompt shipment—50 lb. bags to carloads.

Send for free sample of Solka-Floc D. Prove its effectiveness for yourself. Specify White or Brown color. Address Dept. GF-8 at Boston.

BROWN QUALITY COMPANY, Berlin, New Hampshire
CORPORATION, La Tuque, Quebec

General Sales Offices: 150 Causeway Street, Boston 14, Mass.
Dominion Square Building, Montreal, Quebec

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For good whiteness . . . or true blues
in rubber or plastic tile
specify Calco's

ULTRAMARINE BLUE

59-1824
59-3584
59-5604
59-6204

High resistance to alkalis and soaps

For maximum brilliance in whites specify UNITANE® 0-220 (Titanium Dioxide) . . . for maximum strength and hiding, UNITANE OR-350.

You get highest color purity in Calco's Ultramarine Blues. Calco types are formulated to cover a wide range of shade, clarity and strength to give maximum versatility in compounding.

You can make your selection of these popular pigments according to the properties listed in the table—or call in your Calco representative for complete information.

	Tint
Calco Ultramarine Blue 59-1824	Reddest
Calco Ultramarine Blue 59-3584	Intermediate (Med. Red)
Calco Ultramarine Blue 59-5604	Intermediate (Med. Red)
Calco Ultramarine Blue 59-6204	Greenest

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION, PIGMENT DEPARTMENT
BOUND BROOK, NEW JERSEY

Branches and Warehouses in Principal Cities

Calco®

Announcing

FINEST PARTICLE SIZE ZINC OXIDE SURFACE-TREATED WITH PROPIONIC ACID

PROTOX*-169

First Zinc Oxide To Combine These 3 Advantages:

1. **LARGEST SURFACE AREA**

Protox-169, prepared by surface-treating Kadox-15 with propionic acid, provides a surface area of about 10 square meters per gram. Other zinc oxides range in surface area from 3.5 to 8 square meters per gram.

2. **FAST PROCESSING**

Protox-169 has the unique coating of zinc propionate that is readily wetted by both natural and synthetic rubber. This coating imparts fast incorporation, smooth tubing and calendering.

3. **EXCELLENT DISPERSION**

Protox-169 provides the outstanding dispersion characteristics of the other Protox brands, giving maximum efficiency of activation and reinforcement.

To check these advantages of Protox-169 in your compounds, we shall be glad to send you samples.

*U. S. Patents. 2,303,329 and 2,303,330.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

LAST! A *NEW* SOURCE FOR REBUILDING

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BRAND NEW MIXING CHAMBERS
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Shop facilities of our associates, the Aetna-Standard Engineering Company at Warren, Ohio and Ellwood City, Pennsylvania.

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INCORPORATED

NATIONAL ERIE STAFF JOINS HALE AND KULLGREN, INC. The engineering organization of National Erie, including personnel, drawings and records, have transferred to the offices of Hale and Kullgren, Inc., at 613 East Tallmadge Avenue, Akron, Ohio, and are available to you for prompt service on your processing problems. Complete service on parts and information for all existing National Erie equipment is available.

Sales and Engineering—Hale and Kullgren, Inc., Akron, Ohio, associated with the manufacturing facilities of The Aetna-Standard Engineering Company, Pittsburgh, Pa.

Firestone Loxite® 3000
RUBBER-TO-METAL BOND

Cuts PRODUCTION COSTS

- **ELIMINATES BRASS PLATING**
- **REDUCES REJECT LOSSES**

Loxite 3000 is the positive low-cost method of bonding rubber to metal. Brass plating and tie gums are eliminated. Loxite 3000 is applied hot, eliminating moisture and condensation problems and subsequent bond failure. Simply apply the Loxite 3000 to the prepared metal by brushing, spraying, or dipping; assemble with the compound, and cure. Prepared inserts have a much longer storage life. This remarkable synthetic resin bonding agent has been thoroughly proved under rigorous war conditions on motor mounts, support bushings, bogie wheels, and tracks for tanks and half tracks, and is also a standard specification for many automotive, aeronautical and industrial bonding applications.

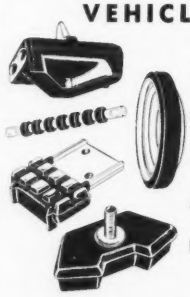
If your problem involves positive adhesion under dynamic conditions in torque, sheer, or compression, Loxite 3000 is the answer. For complete information write Xylos Rubber Company, Technical Service Division, Akron 1, Ohio.

The Permanent, Positive Adhesive for Bonding Ferrous or Non-Ferrous Metals to Natural Rubber or GRS, Cold GRS, Neoprene, Butyl or Buna N-Type Synthetics

AUTOMOTIVE AND AEROPLANE PARTS

Motor Mounts
Pedal Pads
Bushings
Shock Absorbers
Bumpers
Airflex Clutches
Torque Converters
Instrument Mounts

TANK AND ASSAULT VEHICLE PARTS



Tread Blocks
Bogie Rollers
Bushings
Motor Mounts
Idler Wheels

APPLIANCE PARTS

Vibration Dampeners
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Casters
Wheels

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AKRON 1, OHIO

INCREASE PLATEN PRESSURE
45% to 76%

With no change in your present hydraulic lines

...With the NEW ADAMSON UNITED BARREL PRESS

The new Adamson circular-side-plate, or Barrel Press is designed for high pressure molding of synthetic rubber and rubber plastic products. It provides pressures as high as 1800 pounds per sq. in., or approximately that required for light metal forming, with no change in the hydraulic lines that are now operating conventional, low pressure, rod-type presses.

The new Adamson Barrel Press meets the need for close tolerance, high pressure press work, with a minimum of deflection and resultant "flash" in the manufacture of items such as motor mounts, gas masks, crash helmets, carburetor diaphragms and other molded products. Present sizes range from 12" through 32", with larger sizes available to specification.

We believe you will be interested in the economies the Adamson Barrel Press can effect in your operation from the standpoint of both scrap reduction and accelerated product output. Your request for further information will not obligate you.

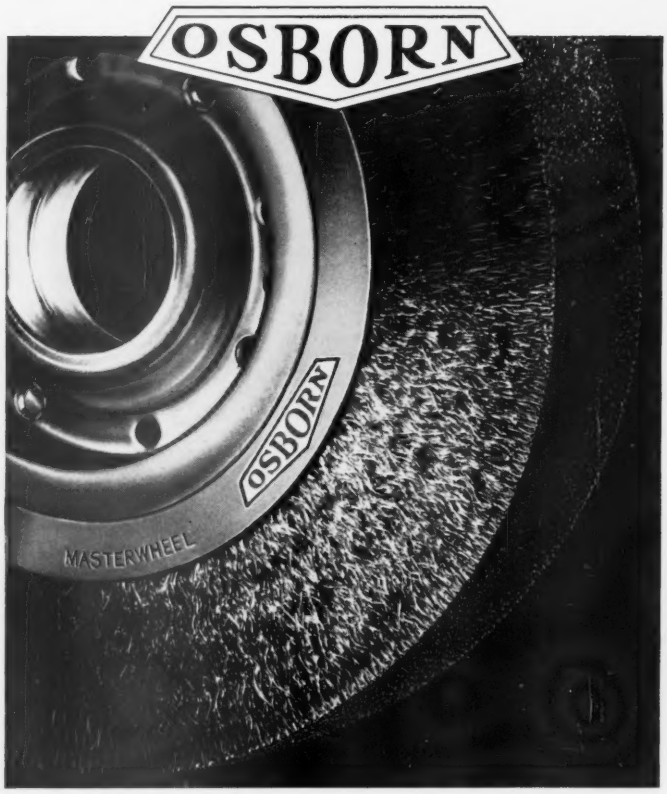
Why not write today?

ADAMSON UNITED COMPANY

AKRON 4, OHIO

BRANCH OFFICES IN PRINCIPAL CITIES

Subsidiary of United Engineering and Foundry Company



Want to get rid of red tape?

Get on the BRAND Wagon! Buy leading BRANDS of industrial supplies from your trusted INDUSTRIAL DISTRIBUTOR. It's simple! No need to shop around. Just "Mass Purchase" routine supplies automatically, *all on one order,* from your INDUSTRIAL DISTRIBUTOR. You cut red tape and get good service and unsurpassed dollar value.

The leading BRAND in industrial brushes since 1892 is OSBORN. Specify OSBORN maintenance, power and paint brushes and order them along with other industrial supplies . . . all on one order. Saves time! Saves money! *The Osborn Manufacturing Company, Dept. 774 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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BUILT FOR INDUSTRY. You can buy OSBORN brushes with confidence because their workmanship and materials are backed by 60 years of OSBORN service to Industry. Here, the OSBORN Master* Sweep Floor Brush gets the job done fast.

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puts more BODY in your SOLE

Adding Marbon "8000" to your Sponge Outsole Compounds will make a good product... better! Marbon "8000" is ready to improve mold flow, increase uniformity of blow, add more consistent plasticity from batch to batch, increase hot-tear strength and improve both hardness and firmness.

ORDER NOW! STOCK READILY AVAILABLE

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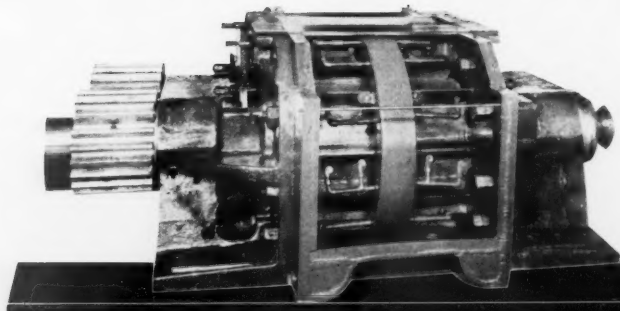
It BLENDS as it STRENGTHENS as it IMPROVES



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A fact of record is that Interstate Welding Service has been rebuilding Banbury mixer bodies for over seventeen years.

Rebuilding a Banbury body — ACCURATELY — is a critical task. Theory and machinery alone could fall short of restoring to worn parts the exact contour, and fit, so necessary to efficient mixing. The foundation tool is hard, practical "know how" . . . a tool acquired only from long attendance at the harsh school of experience.

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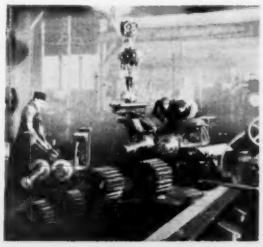
The Manufacturer knows how — assuredly. Interstate knows how — no less. Every Banbury requirement and dimension is known to our engineers and mechanics.

Interstate offers two options: — our Interchange Service and our "Pre-Plan" Rebuilding Service. Write for details and estimates.

Our plant facilities handle every size and type of Banbury, and we can master any problem of restoring worn parts, or fabricating new ones.



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EXCLUSIVE SPECIALISTS IN BANBURY MIXER REBUILDING

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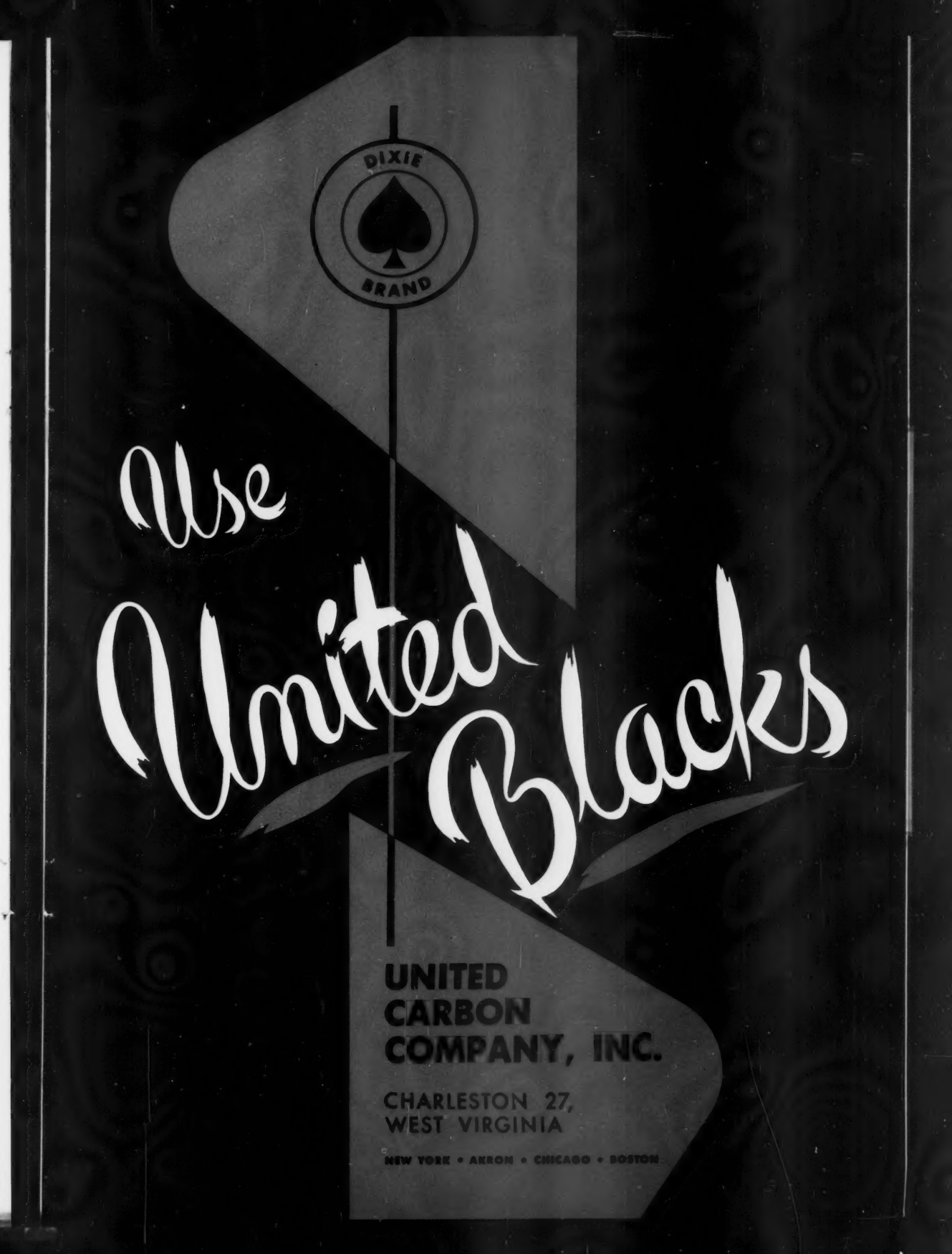
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at hand . . .

the qualities you need!

It is easier to stay in the lead when you standardize on United Blacks. For example, DIXIE 20 . . . an SRF black with extensive applications in the rubber industry. It is a black of dependable uniformity, outstanding for ease of processing, good plasticity and fast rate of cure. For maximum efficiency use DIXIE 20.

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CANADA: CANADIAN INDUSTRIES, LIMITED

"BETTER THAN THE BEST"

For white and light-colored stocks

ANTIOXIDANT 2246*

the most active, non-staining,

non-discoloring antioxidant yet developed.

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AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION

INTERMEDIATE & RUBBER CHEMICALS DEPARTMENT

BOUND BROOK, NEW JERSEY, U.S.A.

SALES REPRESENTATIVES AND WAREHOUSE STOCKS- Akron Chemical Company, Akron, Ohio • Ernest Jacoby and Company, Boston, Mass. Herron & Meyer of Chicago, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • St. Lawrence Chemical Company, Ltd., Montreal and Toronto

bathing suit courtesy of Rose Marie Reid

It Pays to

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CLIMCO

Processed LINERS

because they:

- ★ **Prevent stock adhesions**
- ★ **Greatly outwear ordinary liners**
- ★ **Preserve tackiness of the stock**
- ★ **Eliminate lint and ravelings**
- ★ **Permit horizontal storage**

These and many other proven advantages of Climco Processing save time and money by eliminating down-time, speeding production, protecting stocks and reducing liner replacements. Since 1922, leading rubber companies have found that Climco Processing repays its moderate cost many times over. Give them a trial in your plant.

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Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

CLIMCO

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LINERETTE INTERLEAVING PAPER
Treatment Contains
NO OIL OR WAX
Samples on Request

How Kralastic® made *a tough case for a tiny instrument*

The Sonotone Corporation, a leader in the science of hearing correction, had a problem. Until they talked to Naugatuck!

For the frame of their Model 940 hearing aid, they needed a plastic that was both **hard** and **tough**—to take years and years of everyday use. It had to have **unusual dimensional stability**—to preserve extremely close tolerances. And it had to have great **strength,** even in paper-thin sections—to eliminate unwanted weight and bulk.

Naugatuck's Kralastic styrene copolymer met these rigid requirements perfectly! What's more, it gave plus values—like the heat resistance that greatly reduced assembly rejects caused by soldering heat.

Just look how different the completed instrument is from the "loud speaker" grandpa lugged around. So light, it weighs no more than a pocket flashlight! So compact, it can be worn in a vest pocket—**or even in a lady's hat!**

If you have a material problem... if you need high impact strength, combined with hardness and excellent dimensional stability, it will pay you to investigate Kralastic resins. Why not send us the coupon below, today!

Naugatuck Chemical

Division of **UNITED STATES RUBBER COMPANY** • Naugatuck, Conn.

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MARVINOL® vinyl resins • KRALASTIC® styrene copolymers • VIBRIN® polyester resins • Rubber Chemicals • Aromatics • Synthetic Rubber • Agricultural Chemicals • Reclaimed Rubber • Latices

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applications of

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FOR RUBBER COMPOUNDING

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- ELECTRICAL INSULATION COMPOUNDS
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- BATTERY CASES
- HARD RUBBER COMPOUNDS

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1. THERMOPLASTIC HYDROCARBON RESINS.
2. COMPATIBLE WITH NATURAL AND SYNTHETIC RUBBERS.
3. EFFECTIVE PLASTICIZERS AND SOFTENERS... in highly-loaded clay stocks or in recipes incorporating carbon black.
4. MILL READILY.
5. EXCELLENT DISPERSING AGENTS FOR FILLERS AND PIGMENTS.
6. FACILITATE PROCESSING PROCEDURES . . . impart excellent milling, calendering processing and tubing characteristics to stocks.
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8. POSSESS HIGH ELECTRICAL RESISTANCE PROPERTIES.
9. AID IN THE DEVELOPMENT OF NON-SCORCHY STOCKS... without excessive retardation of cure at high temperatures.

For additional information concerning properties and applications of Velsicol Resins, write:

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GENERAL OFFICES AND LABORATORIES
330 E. GRAND AVE.
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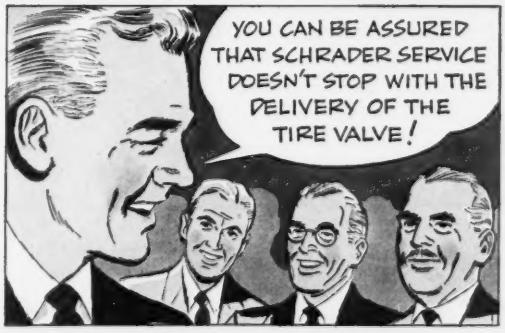
Schrader Contributions to the Tire Industry

Our world-wide service protects your reputation

YOUR NEW TIRES WITH NEW SCHRADER STANDARD TIRE VALVES GO ALL OVER THE WORLD YEAR AFTER YEAR. SOME TIRES AND VALVES WILL BE ABUSED AND NEED REPAIRS.
BUT, AND THIS IS AN IMPORTANT POINT TO YOU, WHEREVER TIRES GO SCHRADER MAINTAINS THE REPLACEMENT PARTS THE KNOW HOW AND THE SERVICE!
WE MAINTAIN STOCKS IN WAREHOUSES AND WITH DEALERS IN EASY-TO-USE, EASY-TO-STORE PACKAGE UNITS. AND WE DISTRIBUTE "HOW-TO" FACTS ABOUT CARS, SERVICE MAINTENANCE OF TIRE VALVES TO HUNDREDS OF THOUSANDS OF TIRE SERVICE MEN.



Schrader service backs you right down to your own customer . . . the consumer. Whether he is a fleet operator with 500 trucks or your neighbor with the family car . . . Schrader provides all the information and equipment to dealers everywhere to help your customer get all the miles you built into your tires.

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FOR ORIGINAL EQUIPMENT AND REPLACEMENT

it STICKS...

and STICKS...

and STICKS!

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the Sticking-est Rubber-to-Metal Adhesive

TY-PLY **Q** or **3640** for bonding Natural, GR-S, and Butyl

TY-PLY **S** for bonding Neoprene

TY-PLY **BN** for bonding N-types

TY-PLY will adhere most vulcanizable rubber compounds to almost any clean metal surface.

Marbon

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

TY-PLY has stood the test of time....since '39

FAST LOW COST BATCH MIXING

with better

PIGMENT DISPERSION IN ALL TYPES OF RUBBER STOCKS . . .

PLASTICIZER HSC-13 (LIQUID)

A new, tested plasticizer, HSC-13 offers vital advantages as an aid to mixing and pigment dispersion . . . It cuts down on the mixing cycle and at the same time gives better dispersion, making it possible to increase output . . . HSC-13 will give slightly increased hardness, better flex life, higher elongation and abrasion resistance. It is effective in low grade stocks with high filler content as well as with natural rubber, GR-S, Nitrile or with blends of various rubbers.

PLASTONE (LIQUID or SOLID)

Plasticizer-Peptizer, PLASTONE is non-toxic, practically odorless and does not impart any color to the compound. It greatly improves dispersion of pigments, resistance to abrasion, aging and flex-cracking. Milled and calendered blanks remain firm with minimum shrinkage — an important advantage where automatic cutting of hot stocks is employed . . . PLASTONE smooths out dry, rough stocks, acts as a non-blooming fatty acid, activates thiazole accelerators, reduces viscosity of rubber solutions . . . It has a strong affinity for all types of synthetic, natural and reclaim rubbers.

Write for bulletins giving complete technical data on these plasticizers.

HARWICK STANDARD CHEMICAL CO.

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BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES

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Body sides are carefully checked for correct diameter from end to end to insure proper clearance between rotors and sides. The same care is taken when rebuilding worn bodies.

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REBUILDS YOUR BANBURY MIXER

you get:

QUICK SERVICE
A MATCHLESS JOB
A NEW-MACHINE GUARANTEE

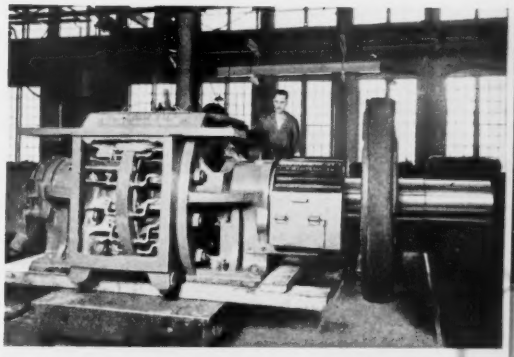
QUICK SERVICE—One reason why we can give you such quick service on your Banbury repairs is because we carry in stock over one million dollars worth of standard parts and complete new bodies. A second reason is that, when it comes to rebuilding worn parts, no time is lost in figuring out original sizes and contours. These dimensions are all shown on drawings we have in our files.

A MATCHLESS JOB—As the sole manufacturer of Banbury mixers for thirty-six years, ours is the only company with the complete knowledge and facilities required to restore one of these machines to its original work capacity. Furthermore, at Farrel-Birmingham, Banburys are constantly being improved in design and materials to meet the more severe, present-day, service requirements. We can incorporate these improvements in your rebuilt machines.

A NEW-MACHINE GUARANTEE—Banbury mixers rebuilt by us carry exactly the same guarantee as new machines. Such a guarantee by the original manufacturer provides assurance that your rebuilt machine will be "as good as new" when it is returned to service.

WHAT ABOUT COSTS? Do not be fooled by the low prices or exaggerated claims made by some repair shops. The high quality of our repair work cannot be matched at lower prices. New parts are priced fairly; suitable allowances are made for old parts taken in trade.

FREE INSPECTION SERVICE—A complete and competent inspection service, by factory-trained mechanics, is available to you at any time. A letter, phone call or wire to one of the offices listed below will bring an inspector to your plant anywhere in the United States, promptly and without cost to you.



Rebuilt Banbury body ready for shipment. Only Farrel-Birmingham has complete jigs, fixtures and gauges essential to restore Banbury parts to their original sizes, contour and efficiency.

Hundreds of rotors are in stock at our Derby plant.

Welded steel sides for size 11 Banburys. Complete rebuilt bodies are sometimes available.

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AKRON, OHIO, 2710 First National Tower (Tel. Jefferson 3149)
CHICAGO, ILLINOIS, 120 So. La Salle Street (Tel. Andover 3-6434)
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Easy release and clean molds with DOW CORNING Mold Lubricants

Production has gone sky-high since the company switched to Dow Corning Silicone release agents, and Moe Muscles never had it so good. Inspector Mike can't quibble, either. Molded parts are cleaner than ever before. Sharp, uniform detail, closer tolerances and high surface finish have become commonplace. Scrap has dwindled away to the vanishing point.

Mike knows that other production costs have dropped off, too. Molds stay clean from 5 to 20 times longer than when lubricated with ordinary release agents because Dow Corning silicones can't break down to form a carbonaceous build-up on mold surfaces. Cleaning schedules are reduced, service life is lengthened and maintenance costs are cut by as much as 80%.

For easier release and lower costs, specify Dow Corning silicone mold release agents: emulsions for molds and curing bags; fluid for green carcass, bead and parting line release.

Deep Cavity Molds

Curing Bags

Heavily Loaded Stocks

DOW CORNING SILICONES MEAN BUSINESS!

For more information call our nearest branch office or write direct for Data Sheet CM-20.

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Stauffer CHEMICALS SINCE 1885

Now that you can again manufacture white wall tires, you will want to prevent production losses that occur if a quality insoluble sulphur is not used. You well know the ugly stains and unsalable off-color product caused by sulphur bloom when ordinary sulphur is used. By using CRYSTEX, guaranteed to contain at least 85% insoluble sulphur, you can produce the cleanest and whitest of white-wall tires.

Let us send you our circular which describes CRYSTEX. It lists various applications of CRYSTEX such as tire carcass stocks, white sidewalls, tube-stocks, re-tread and other repair stocks, mechanicals, naphtha cements, latex dispersions, reclaim stocks and bin stocks. Write for your free copy of this Crystex circular today.

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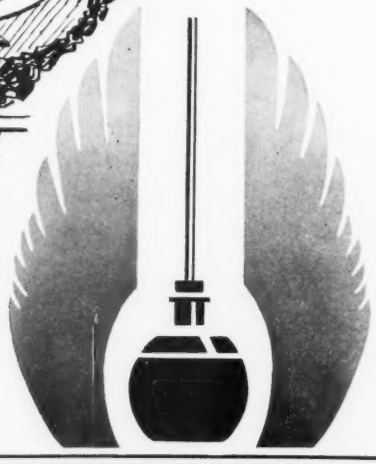

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the VERSATILE resin

**for EXTENDING,
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because Piccolyte is

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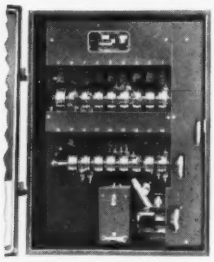
These TAYLOR CONTROLS



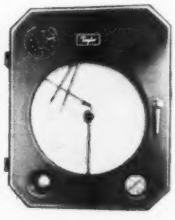
The Taylor FLEX-O-TIMER* Controller will precisely control sequence and duration of practically any operations involving temperature, pressure, or motion, pneumatically or electrically operated, or in any combination. Standard models are available with one to eighteen separate functions. Ideal for platen presses, tire presses, etc.

can save you money

Taylor's FULSCOPE* Time-Schedule controller will repeat exactly any predetermined program involving temperature, pressure, flow or level, or any two of these. It controls rate of rise, hold periods, and rate of fall, in any desired sequence. Ideally suited for any type of vulcanizer.

making most any Rubber Product!

Taylor's FULSCOPE Temperature Controller with Process Timing mechanism controls temperature and curing time of cycle. Automatic timing does not start until set temperature is reached. Needs no manual attention until signal light announces completion of vulcanizing cycle. Ask your Taylor Field Engineer, or write: Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.



Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

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announcing

COLUMBIA-SOUTHERN'S NEW RUBBER PIGMENT

calcene nc

PROVIDES EXCELLENT *whiteness* AT REDUCED COST

Calcene NC is the latest addition to Columbia-Southern's family of white reinforcing pigments.

It is non-coated, fine-particle precipitated calcium carbonate that imparts superior whiteness to white or light colored molded goods when compared with other pigments on the market. It is similar in physical and chemical properties to Calcene TM, except that it is non-coated.

Thorough tests of four competitive pigments, on the basis of physical properties obtainable in white stocks, shows Calcene NC the most economical by far.

Calcene NC disperses easily under normal mixing procedures and will show no variation where masterbatching techniques are employed. In some cases, it may be possible by using Calcene NC to eliminate the masterbatching step without sacrificing results.

Samples of Calcene NC for your experimental purposes are available for the asking. Columbia-Southern is glad to render technical assistance to you on the use of Calcene NC or any of its other pigments. You are invited to contact us today at the address below.

Columbia-Southern exclusive pigments for the rubber industry

CALCENE NC · CALCENE TM

SILENE EF · HI-SIL

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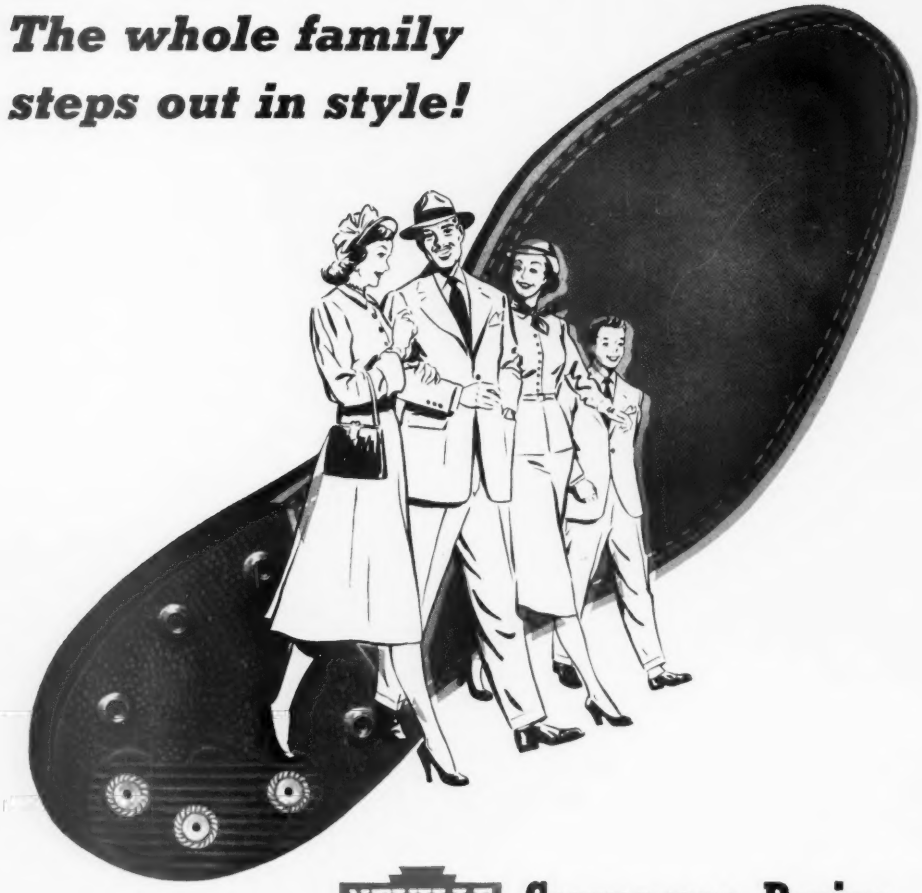
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES: FIFTH AVENUE AT BELLEFIELD, PITTSBURGH 13, PA. *DISTRICT OFFICES:* BOSTON • CHARLOTTE • CHICAGO • CINCINNATI CLEVELAND • DALLAS • HOUSTON • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ST. LOUIS • SAN FRANCISCO

The whole family steps out in style!



. . . thanks to **NEVILLE Coumarone Resins**

Why not call on Neville's years of experience and "know-how" to help you in your particular problems.

• PRODUCTS OF TOMORROW FROM THE CHEMICALS OF TODAY

The buyer of shoes looks for style, lightness, flexibility, comfort, waterproof protection and long wear!

The manufacturer, on the other hand, in order to guarantee these necessary selling points, seeks tensile strength, abrasion resistance, flex-life and uniform quality in the stock he uses for producing quality foot-wear!

That's why Neville Coumarone Resins are being used in sole and heel compounding in ever-increasing volume. Through them manufacturers enjoy improved properties and production advantages, building tack in their compounds without sacrificing hardness, tensile or tear.

THE NEVILLE COMPANY • PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

DOUBLE-CHECKED ✓ CHEMICALS FOR THE RUBBER INDUSTRY...

VULTAC #2

FOR IMPROVED PROPERTIES OF SULFURLESS CURES

COMPOUND	A	B
GRS-S 100	100.0	100.0
HAF Black	50.0	50.0
Zinc Oxide	3.5	3.5
Stearic Acid	2.0	2.0
Petroleum Softener	10.0	10.0
Antioxidant	1.0	1.0
Sharples Accelerator 52-9	**3.0**	**1.5**
VULTAC #2	—	**3.0**
Cured 45 minutes at 280 F		
	Before Aging	
Modulus at 300% E	1325 psi	1150 psi
Tensile Strength	2675 psi	2925 psi
Elongation	500%	600%
Durometer Hardness	59	58
Crescent Tear	210 lb. in.	290 lb./in.
	Aged 4 Days at 212 F in Air Oven	
Modulus at 300% E	2050 psi	2050 psi
Tensile Strength	2475 psi	2825 psi
Elongation	350%	390%
Durometer Hardness	65	66
Crescent Tear	170 lb. in.	220 lb./in.

Use the coupon below for sample of Vultac #2 and Data Sheet A-52 giving more information about this type of compounding.

SHARPLES TRADE MARK CHEMICALS

SHARPLES CHEMICALS Inc.
123 S. Broad Street, Philadelphia 9, Pa.
Please send: ☐ Sample of Vultac 2 ☐ Data Sheet A-52
Name _____ Title _____
Company _____
Address _____

SHARPLES CHEMICALS INC.
A SUBSIDIARY OF THE PENNSYLVANIA SALT MANUFACTURING COMPANY
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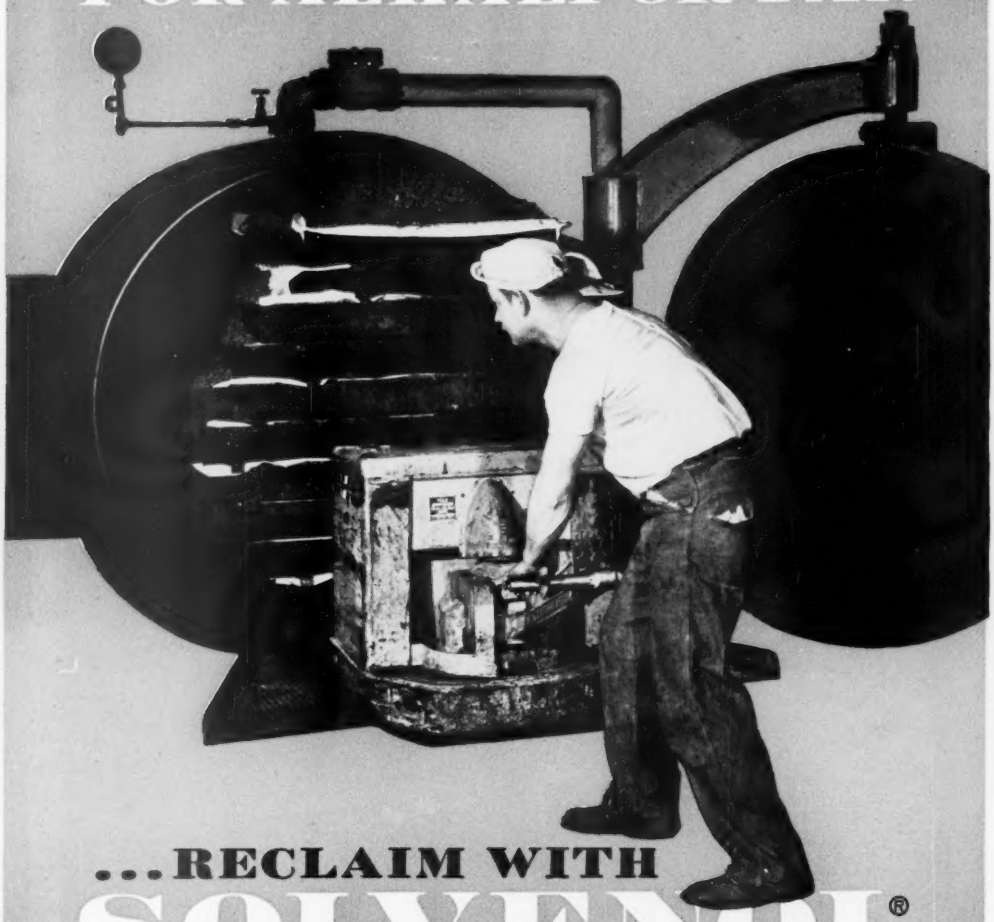
FOR ALKALI OR PAN



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Solvenol is a long-established and widely used reclaiming solvent for both natural and synthetic rubber. Used in both the alkali digestion and pan processes, it will improve your reclaim. Have you looked at Solvenol recently? It's in dependable supply. Write us for prices.

Many Hercules chemicals have helped in the development of synthetic rubbers and in improvements of natural rubber products, too. These included hydroperoxides used as polymerization catalysts, hydrogenated rosin, polymerized rosin, Vinsol® resin, emulsifiers, casein, and purified cotton linters as a base for tougher tire cords. Hercules welcomes the opportunity of placing its long experience in rubber and associated chemical materials at your disposal.

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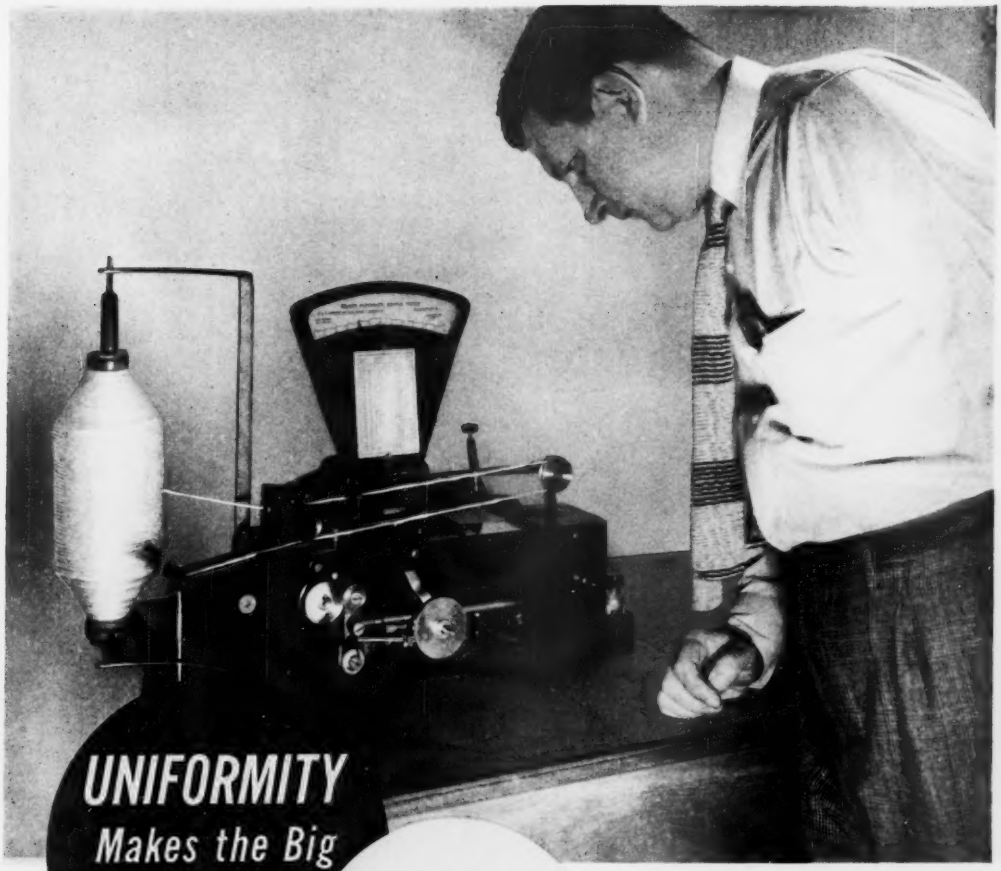

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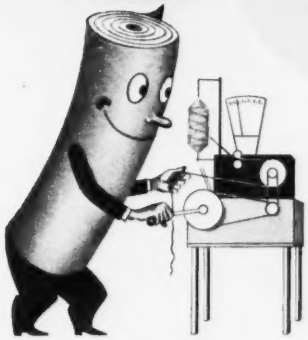
In INDUSTRIAL Fabrics



MT. VERNON FABRICS Give You Greater Fabric Uniformity

Shown is one of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products. Here coefficient of variation and average factors of quality on evenness in roving is being checked with Belger Tester.

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KNIT METHOD OF HOSE REINFORCEMENT

Model D-25 Knitter & Take-up Reel Stand

Gives you faster production at less cost

- ★ Improve product quality
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- ★ No yarn rewinding or treating
- ★ Boost labor output 500%
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Producing strong flexible hose with this Fidelity Hose Reinforcement Machine at lower cost puts you ahead of competition. Produced in continuous lengths at over 1,000 feet every hour, *Knit*-Reinforced is widely used as garden, automotive heater and radiator, and industrial hose.

The Fidelity *Knitter* uses only 4 yarn cones, each weighing 10 pounds. *Knitting* eliminates costly rewinding and treating operations and drying time. Diameters are uniform; adhesion is stronger. Automatic electric stop motions and other advanced features cut maintenance and down time.

Automatic Take-up Reel Stands are available for both single or double deck *Knitters*. To see why top companies choose Fidelity, read our literature proving its advantages. Write today for Catalog I.

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FOR NATIONAL DEFENSE today Stanley Plastisols and Organosols can be formulated to meet rigid government specifications, with emphasis on low temperature flexibility and fungus resistance.

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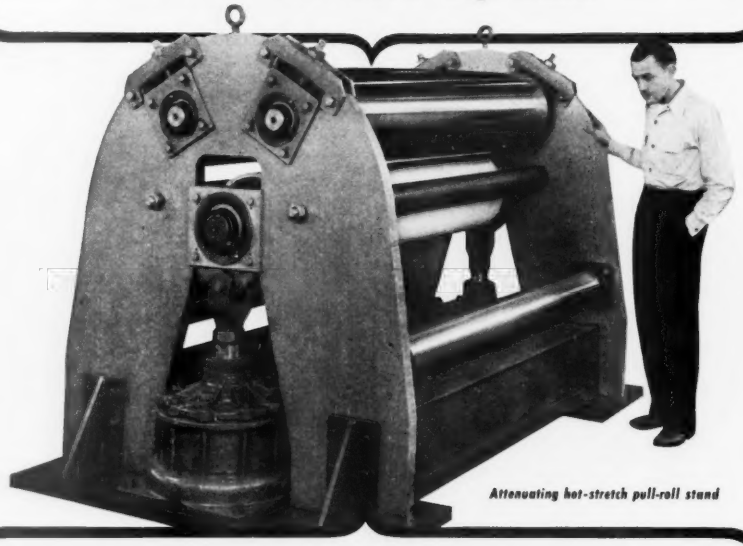
Full Width Fabric

or Weftless Cord Dip Units

101 ENGINEERING VERSATILITY



Attenuating hot-stretch pull-roll stand

Latest model 101 nylon tire cord latexing units produce full width dipped cord fabric with warp cord of the following characteristics:

- TENACITY . . . . 26 to 28 pounds
- ULT. ELONG. . . . . 14% to 17%
- ELONG. at 10# . . . . . 5% to 6.5%
- DENIER 840/2
- LATEX ADDITION . . 6% to 10%
- CORD TENSION . 4# to 7# per end
- DRAW DOWN 8% to 12%—at windup
- FINAL MOISTURE 0.75% by weight

• A medium size single unit installation will produce up to 15,000 pounds of treated cord per 8 hours. Units now being built will produce 30,000 pounds of nylon per 8 hours and will deliver this treated cord fabric continuously to the calender for rubber application.

• Units are available for simultaneous impregnation and hot stretching as a separate operation or as a combined unit in train with high speed "Z" or "L" calenders. Units are available to handle woven or weftless fabric construction in cotton, rayon or nylon cord as *a full width fabric.*

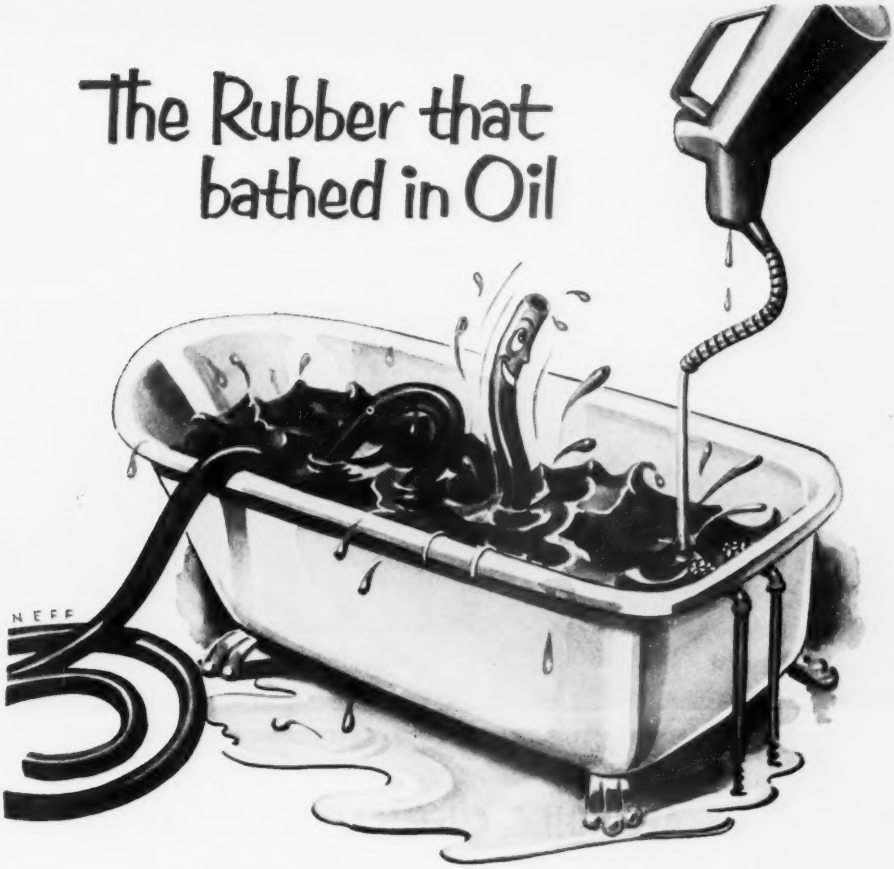
Technical data will be sent to interested executives, engineers or technical men upon request on your company letterhead.

101 ENGINEERING VERSATILITY

INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

The Rubber that bathed in Oil



and loved it!

Yes, oil and rubber really do mix! That is, if the rubber is **Paracril**®, the special chemical rubber this hose is made of. It really "gets along" with even the most destructive petroleum products!

And tough **Paracril** combines this exceptional oil resistance with—unusual low-temperature flexibility—good heat resistance—high tensile strength—and rubbery resilience.

Paracril is an exceptionally easy processing nitrile type rubber. And it can be combined with other rubbers and many plastics to give them special desirable properties.

Three general grades of **Paracril**, A, B, and C, provide three ranges of oil resistance—moderate, good, and excellent—to meet your particular requirements. Modifications of each general grade are available for special applications.

Free samples are available for development studies. Send the coupon today for samples and full technical data.

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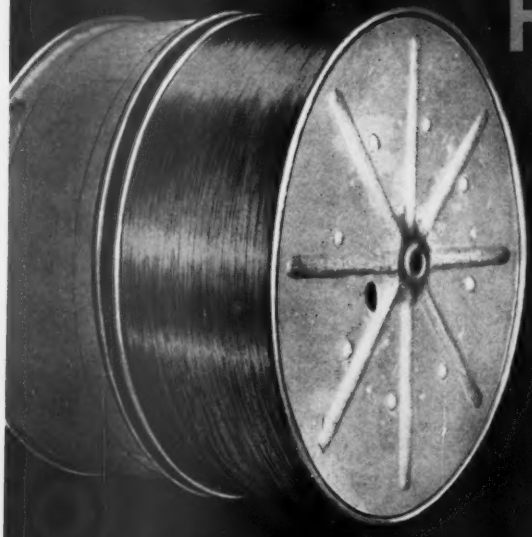

Hose REINFORCEMENT WIRE

JOHNSON special bronze plated wire, for many years the preference of major tire manufacturers — now available for vacuum and defroster hose producers, in addition to conventional liquor finish wire.

• Uniformly clean finish • Maximum adhesion to rubber • Higher elongation • Extra fatigue properties

Johnson line of specialty wires also includes oil-tempered and coldrawn brush wire—tire bead wire—steel wire for field telephones —music spring wire.

If it's steel wire- JOHNSON specialists make it better

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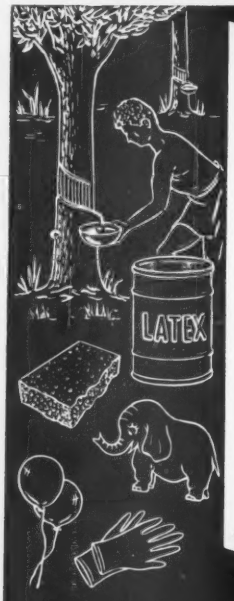

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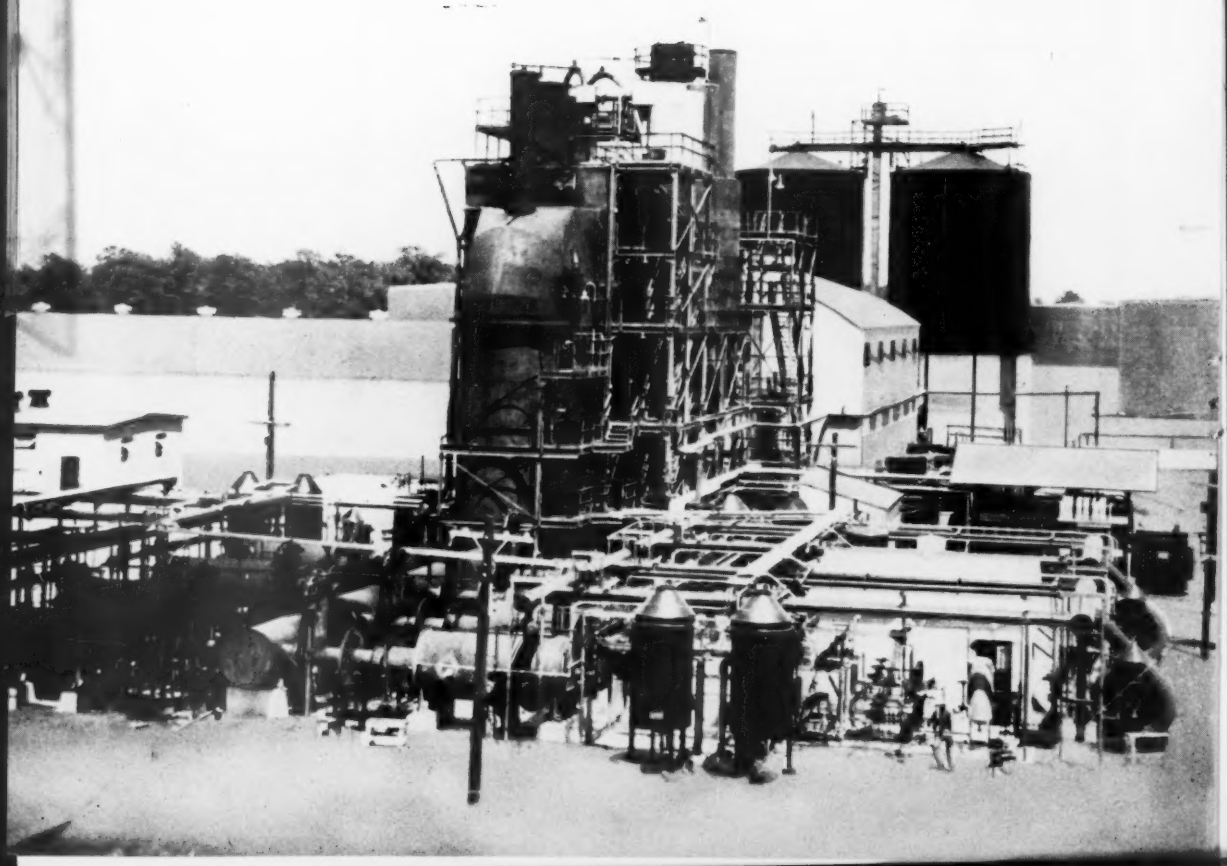

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RUBBER AGE

Vol. 71, No. 5 AUGUST, 1952

Trace Elements in Natural and Synthetic Rubbers

By ARTHUR R. DABALD

Development Engineer, Dominion Rubber Co., Ltd., Montreal, Canada

Trace elements may occur in natural rubber latex, or may be introduced during processing, or during the actual polymerization of the synthetic rubbers. Compounding may introduce many more. An investigation of the mechanism whereby they cause falling off of physical properties of the rubbers can best be made by reference to the processes of auto—as well as induced—oxidation. The role of trace elements in rubber oxidation suggests methods for their deactivation. The assistance of antioxidants in any scheme of protection against harmful trace elements is related to the relative oxidation-reduction potential of the rubbers, the antioxidants, and to the potential ionic state of the various trace elements themselves.

LIKE most biological products, natural rubber latex contains trace elements such as Cu, Mn, and Fe. Coagulation leaves most of the copper behind in the serum. Up to about .002% Cu remains in the coagulated rubber in a harmless form. Rubbers have been stored for 35 years and then used satisfactorily. A similar harmless form of manganese remains, but wash water during creping has been shown to introduce active manganese *(1)*.

Iron is also naturally present in natural rubber latex and may be increased in concentration by irrigation waters as well as from steel rolls during creping. Soaps, fortunately, reduce mill friction between coagulum and rolls and reduce this tendency to absorb iron. The naturally occurring lecithins similarly reduce friction but they disappear during storage or through latex purification.

Many compounding ingredients introduce harmful trace elements into rubbers. Alum coagulants used in the manufacture of GR-S supply harmful ferrous sulfate to the polymer *(2)*. Ferric oxide similarly introduced during coagulation has been found to be a harmless form of iron. In industrial use we find that copper wire accelerates the aging of neoprene jacketing. Certain polymers, such as Butyl rubber, seem to be unaffected by large amounts of metal powder or metal salts, including Cu, Mn, Fe, Ni, Co, Pb, Cd, Al, Zn, Sn, Bi, Mo, Cr, etc. *(3)*.

Cause of Major Deterioration

The major deterioration induced by the presence of trace elements is associated with oxygen absorption by raw and vulcanized rubbers but, as will be pointed out, many are the ways in which absorbed oxygen alters rubbers. However, from a practical point of view it is the deterioration of the physical properties of vulcanizates that is the major concern of the rubber formulator and manufacturer. We might almost narrow it down to fall-off of physicals due to oxidative scission of the polymer chains. This indeed is a broad statement but,

Note: This paper was presented before the Rubber Chemistry Division, Chemical Institute of Canada, at Montreal, Canada, on June 4, 1952.

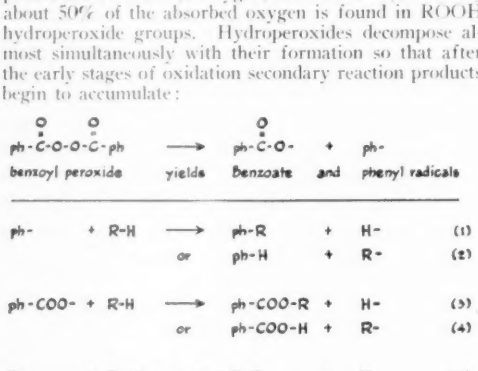
before we consider methods of counteracting the ravages attributable to the presence of trace elements, let us look further into the actual mechanism whereby such active forms of trace elements alter the physical properties of rubbers adversely.

As a starting point in such an investigation we find that the first step in the auto-oxidation of monoölefins and of unconjugated polyolefins is the production of hydroperoxides which in turn may decompose in various ways. Oxygen is absorbed and attached by substitution at the alpha methylenic hydrogen and subsequently converted to the hydroperoxide made up of one atom of active hydrogen and one atom of active oxygen *(4)*. The olefinic double bonds remain intact except where the peroxidic groups have undergone secondary decomposition involving utilization of their active oxygen for attack at the unsaturated centers. Such secondary decomposition usually occurs simultaneously with peroxidation. In the case of rubber these peroxides are usually unstable and the important factor in relation to physical properties is the manner in which these peroxides decompose, i.e., whether by thermal, photochemical or by direct chemical means, such as by trace element catalysis.

Oxidation of Organic Compounds

Most organic substances undergo oxidation but rubber (natural or synthetic, raw or vulcanized) is peculiar in the magnitude of effects brought about by absorption of relatively small amounts of oxygen *(5)*. Rubber has a potential unsaturation to combine with about 40% of its weight in oxygen. Now benzaldehyde has an unsaturation potential to combine with roughly 30% oxygen. One percent oxygen absorbed by rubber destroys 4% of the unsaturation and leaves the rubber no longer serviceable. One percent oxygen absorbed by benzaldehyde destroys 6% of the unsaturation yet the resultant 94% benzaldehyde is still fit for most of its original uses. A still further example is the tackiness developed in rubber mixes on absorbing only .05% oxygen while exposed to an S-1 sun lamp *(6)*.

Another point to be noted is that in oxidation of simple monoölefins 4 to 5% absorbed oxygen yields 90 to 100% hydroperoxides by replacing alpha methylenic hydrogens by OOH groups. Over 5% degrades the hydroperoxides and oxidizes the primary products. Such is the mechanism of many drying oils used in paint. Should polyisoprenes absorb 4 to 5% oxygen, not 90 to 100% but only about 50% of the absorbed oxygen is found in ROOH hydroperoxide groups. Hydroperoxides decompose almost simultaneously with their formation so that after the early stages of oxidation secondary reaction products begin to accumulate:



To study these secondary reaction products let us first look at the manner in which dibenzoyl peroxide attacks unsaturated organic materials *(4)*. This is roughly analagous to the way in which rubber peroxides react with unoxidized rubber chains to promote and continue oxidative degradation (see above).

Above 100° C. dibenzoyl peroxide breaks up into very active phenyl and benzoate radicals which attack organic substances (such as R-H representing rubber with its nascent alpha hydrogens) to form new compounds (equations 1 and 3) as well as generate new free and very active radicals (equations 2 and 4), or, in other words, the phenyl or benzoate radicals may react with organic substances by substitution of the alpha methylenic hydrogens by phenyl or benzoate groups with liberation of active alpha hydrogens (equations 1 and 3). This alpha methylenic substitution occurs far more frequently than reaction at the double bonds.

An alternative course of reaction is for the phenyl or benzoate radicals to react with R-H to yield (as in equations 2 and 4) either phenol or benzoic acid plus new free organic active radicals by virtue of their being shorn of an alpha hydrogen to stabilize the phenol or benzoic molecules. Now we can visualize these new radicals reacting (as in equation 5) with more R-H to form R-R plus active hydrogen ions, etc. In other words, Be have brought about polymerization.

Initiation and Propagation Reactions

Likewise, simple monoölefins undergoing oxidation are similarly shorn of labile alpha hydrogens to form active R- and ROO- radicals. Such are the "initiation reactions." Other reactions may continue or promote oxidation, as is the case when R- plus oxygen forms ROO- radicals, or when ROO- reacts with more monoölefin R-H to form ROOH hydroperoxides, and at the same time generate more R- radicals (as in ROO- plus R-H to form ROOH plus R-). These, it can be appreciated, are the "propagation reactions." Oxidation may be "terminated" only by such "reactions" between R- or the ROO- radicals to form non-radical products. The hydroperoxide sequence therefore depends on the average number of times the propagation sequence is repeated before the R- and the ROO- radicals are removed by one of the termination reactions.

Oxidation of Diisoprene

It may seem that we have strayed from our original mechanism of rubber oxidation, but let us now note the parallelisms in reviewing the actual oxidation of polyisoprenes *(7)*. In rubber, oxidation not only occurs at the alpha but extensively at the delta carbon atom as well. Diisoprene, as an example of an unconjugated diolefin, undergoes initiation reactions to form an active R- radical, as follows:

$$-CH_2-CMe=CH-\dot{C}H-CH_2-CMe=CH-CH_2-$$

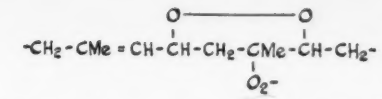
This R- plus O_2 forms

$$-CH_2-CMe=CH-\underset{\displaystyle O-O}{\dot{C}H}-CH_2-CMe=CH-CH_2-$$

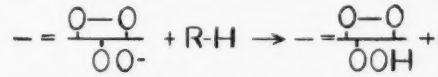
Now we perceive a new type of reaction wherein the unstable peroxide undergoes intramolecular bridging to yield a new $R'O_2$. radical, as follows:

$$-CH_2-CMe=CH-\underset{\displaystyle O}{\dot{C}H}-CH_2-\underset{\displaystyle \dot{O}}{CMe}-\underset{\displaystyle O}{\dot{C}H}-CH_2-$$

This broken and bridged double bond still leaves a radical capable of absorbing two more atoms of oxygen, as follows:



Where the simple monoölefins absorbed two atoms of oxygen, diisoprene absorbs four atoms of oxygen. We find that this four oxygen radical may react with more rubber to form a hydroperoxide plus a new radical by this additional propagation reaction:



The preference of the initially formed RO_2- to add at the olefinic double bond rather than extract an alpha methylenic hydrogen has been noted. This intramolecular bridge formed on taking up the first two atoms of oxygen is fairly stable and resists common rubber peroxide reducing agents, such as ferrous salts.

Influence of Trace Metals

The contribution of ferrous salts to the poor aging of alum-coagulated GR-S has already been mentioned. From the foregoing it can now be appreciated that it is not during the initial absorption of oxygen by the butadiene-butadiene sections of the polymeric chains (unconjugated diolefin sections) but at the later stages of oxidation where ferrous ions present tend to reduce any hydroperoxides formed to regenerate active radicals, i.e., ferrous ions change termination into propagation reactions. Iron salts actually play the dual role of peroxide promoter and of hydroperoxide destroyer. The harmful effects of iron are more exaggerated in arctic rubbers with their high butadiene content and resultant greater possibility of butadiene-butadiene chain segments. Conversely, Butyl's low percentage of unsaturation enhances its resistance to trace metal attack.

As little as .05% oxygen absorbed by unvulcanized rubber exposed to an S-1 sun lamp causes tackiness. Antioxidants actually accelerate this early stage of oxidation. Highly oxidized uncured rubber is manufactured as Rubbone $C_{16}H_{16}O$ for imparting flex, acid resistance and metal adhesion to varnishes and lacquers. Mastication of rubber in air promotes peroxide formation with only a small percentage of oxygen absorbed and brings about a major change in physical properties. The change takes place quickly *(8)*. The unstable peroxides decompose causing chain scission, i.e., initiation and propagation reactions become predominant and the powers of any antioxidants present thus fall off due to mass action. The peroxides, however, may persist for several days even though oxidation ceases when mastication stops.

The types of rubber in which the peroxides most quickly disappear are the most difficult to plasticize. The various chemical plasticizers apparently promote oxygen absorption and peroxide decomposition to bring about scission. Most aging test methods merely measure scission effects. A truer picture would be a measure of the molecular weight of oxidized rubber to determine the number of bonds broken per gram of oxygen absorbed. A surprising fact is that such a measure of "scission efficiency" stays almost constant at 2% regardless of temperature, oxygen pressure, or extent of oxidation.

The ratio of oxygen causing scission to oxygen attachment is inversely proportional to the oxidation chain length. Much oxygen may be absorbed by attachment without greatly affecting physicals, but scission effects are large.

Scission entails the initiation reactions wherein ROOH forms R- or RO_2- radicals, as well as the actual breakdown of these R- and RO_2- radicals themselves. Scission occurs extensively at the double bonds but appreciable scission at the C-C adjacent to the severed double bonds also occurs. Should traces of copper be present, depolymerization and scission rates are greatly increased in unvulcanized rubbers *(9)*. But it should be noted that if peroxides are used to promote oxidation the presence of copper does not accelerate the process of oxidation. Hence, traces of copper act to accelerate depolymerization but are not actual accelerators of oxidation in unvulcanized rubbers. Bivalent copper Cu^{++} promotes peroxide formation by removing alpha methylenic hydrogens to form (Cu^{+} and an R- radical) copper of reduced valence, an active hydrogen and a hydrocarbon radical, i.e., we have initiating and subsequent propagating reactions. So it can be seen that copper is not a carrier of atomic oxygen to accelerate oxidation but rather it promotes depolymerization so that subsequent oxidation then proceeds under more favorable conditions.

Both copper and manganese stearates are soluble in rubber and it would appear they may be changed to the oxides by the zinc *(10)*, oxygen being absorbed from the air and given up to the rubber in an active atomic state (i.e., copper is changed into its bivalent ionic state and is reduced by the alpha methylenic hydrogen of the rubber to form a labile rubber hydrocarbon radical plus a nascent oxygen—an ideal state for forming peroxides). This more or less refutes the statement that copper is not a carrier of atomic oxygen; but we must more correctly look upon the reaction as one in which a soluble copper compound is made ionic in a bivalent state to be present as an alternate reaction path for the rubber hydrocarbon with its not too tightly bound alpha hydrogens.

Deactivating Harmful Trace Metals

The tendency of metallic compounds to ionize has been found to be proportional to their ability to promote oxidation. This is one of the major clues in deactivating trace elements. It has been suggested, and is under investigation, to chelate the metals and so tie them up in molecular complexities as to preclude any ionization and thus not add to the natural forces striving to reduce rubber to active radicals *(11)*. Phthalocyanine blues are satisfactory for use in rubber by virtue of their complexed and deactivated copper.

One major drawback to the use of chelating agents is the fact that many fillers introduce large concentrations of Ca, Zn, Mg, etc., which tend to use up the chelate agent due to their concentration being greater than that of the harmful trace metals. QSN, for example, is ineffective in latices where ZnO is also present.

Many metal inhibitors *(12)* give only fair protection against harmful trace elements, unless used in conjunction with antioxidants. Other inhibitors *(13)* deactivate small amounts of Cu, Co and Fe, but act catalytically on other traces such as Mn and Ui. Cyanide complexes *(14)* are sometimes formed with harmful metals in latices and are removed by dialysis, absorption or ultrafiltration, or by creaming with starch and removing the complexes in the serum.

Experience has shown there are harmful and less harmful as well as almost harmless forms of trace elements. Now a complete spectrum of activity for these versatile trace elements is found when we consider the

fact that other forms are actually desirous. We have the cuprous mercaptides as vulcanization accelerators as well as the many other forms of copper activators of vulcanization.

The Japanese point out CuO activates TMTDS-sulfur cures *(15)* but is of no avail where sulfur is not employed. .01 Cu has been found to enhance a DPG stock by promoting cross-linkages but .05% Cu ruins physicals as chain scission reactions become predominant. In general, oxides lower than zinc in the electrochemical series, such as lead, cadmium and copper, activate TMTDS-sulfur cures and remain as metal sulfides after vulcanization. The sulfides are formed by reaction with H_2S formed during vulcanization and not by direct reaction with sulfur. Thus, trace elements may be classified as good, bad or indifferent.

The Role of Antioxidants

Antioxidants in general reduce or partially inhibit harmful trace metals. Just as the rubber has labile hydrogens (R-H), so too do the organic antioxidants, which may be represented as A-H. Should the H of A-H be more easily removable than that of R-H, then the rubber ROO- peroxides are provided with an alternate path of reaction *(7)*. Should A-H regenerate R- or ROO- radicals, oxidation would be catalyzed. Conversely, if A-H were able to produce only termination reactions, oxidation would still take place by the instability of ROOH produced by the inhibiting reaction, to say nothing of the fact that such action would gradually use up the antioxidant.

To further complicate this picture, if any Cu^{++} ions were present the A-H would have to loose a hydrogen more readily than R-H to satisfy the hūngrў copper ions all too ready to reduce rubber to active R- radicals so easily oxidized and subsequently degraded. We see the need for controlling the oxidation-reduction potential to bring about antioxidation as well as to reduce copper deterioration. The phenol and hydroquinone types of antioxidants owe their effectiveness to just such controlled oxidation-reduction potentials. If this potential is too low A-H will react more readily to form A- to terminate RO_2- radicals; but at the same time A-H itself becomes so easily oxidized it may even be removed from the system by molecular oxygen and other weaker oxidizing agents, i.e., the antioxidant may be removed by a non-inhibitory process. For practical value, therefore, an antioxidant must fall within a certain range on the oxidation-reduction scale.

Amine antioxidants have a more complex scheme of reactivity. True, their rating depends on the relative ease of loosing an H from N-H to combine with ROO-, etc., but other direct reactions between the amines and the ROOH hydroperoxides also take place simultaneously. Normal oxidation generates R- and ROO- at the same time as ROOH hydroperoxides are breaking down. The amine antioxidants suppress or modify this decomposition. Here again we must also have an amine antioxidant successfully competing with the tendency of any Cu^{++} present to generate initiation radicals.

Summary

In summarizing we can state that the course of oxidation of rubber yields to the net effect of the following directions of reaction:

(a) The natural tendency of R-H to form R- and ROO- radicals with subsequent formation of ROOH hydroperoxides with their inherent instability tending to regenerate R- or ROO- by scission or by reaction with more R-H.

(b) The inclination of rubber to give up an alpha or delta hydrogen to form R- readily oxidizable to RO_2-, which strongly favors intramolecular oxidation breaking of a double bond to yield a new type of R- with its free reactive center also readily oxidizable.

(c) The course of oxidation also depends on the presence of antioxidants more easily oxidized than the rubber itself plus the ability of certain antioxidants to modify or suppress hydroperoxide breakdown. Oxidation may proceed more and more uninhibited as antioxidants become used up. Some antioxidants are volatile and many are prone to bloom and be used up by non-inhibitory processes.

(d) The complexity of the oxidation picture does not end here. The eagerness for the electron hungry Cu^{++} bivalent copper ions, and certain other trace metals, to remove an -H from a rubber molecule to yield a highly reactive rubber radical R-, as well as to even more readily oxidize and so use up any antioxidants present, also tends to direct the course of oxidation.

These are but a few of the main factors linked with the presence of harmful trace elements that induce deterioration of rubbers and we still have not seriously considered the role of sulfur or made a comprehensive study of the influence of accelerators on trace metal action. Progress is being made and this field is wide open for systematic investigation.

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Behavior of Neoprene Vibration Isolators at Various Temperatures

By ROSS E. MORRIS and ROBERT R. JAMES

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VIBRATION isolators are being made commercially from neoprene. It was suspected that these isolators might not be entirely satisfactory for extended service at moderately low temperatures because of crystallization, or for extended service at moderately high temperatures because of excessive drift under load. The purpose of the work reported here was to investigate the behavior of a neoprene vibration isolator over the range of temperatures which might be encountered in naval service.

The neoprene vibration isolator selected for these tests was a shear-compression type mount with a nominal load rating of 300 pounds and a nominal natural frequency of 15 cycles per second when so loaded without moment. A photograph of the mount is shown in Figure 1 and a sketch of the cross section of the mount is shown in Figure 2. The mounts tested were made from neoprene (stated to be Neoprene Type RT) by a commercial rubber manufacturer.

Importance of Dynamic Stiffness

The purpose of a vibration isolator is to reduce transmission of vibration from a machine into its foundation, or to reduce transmission of vibration from a foundation into supported equipment. The dynamic stiffness of the isolator and the load on the isolator determine the natural frequency of vibration of the system, in accordance with the following equation:
natural frequency in cycles per second,

$$f_n = \frac{1}{2\pi}\sqrt{\frac{kg}{w}} \qquad (1)$$

Note: The opinions or assertations in this article are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

FIG. 1—Neoprene mount with 300-pound capacity.

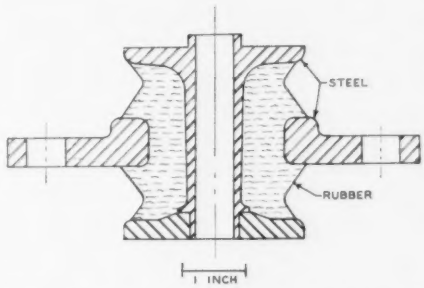

FIG. 2—Cross section of neoprene mount with 300-pound capacity.

where, k = dynamic stiffness of isolator in pounds per inch deflection,
g = acceleration due to gravity (386 inches per second per second), and
w = load in pounds on isolator.

The natural frequency of vibration of the system is the factor which determines the minimum impressed frequency of vibration that can be isolated. The latter frequency is more than $\sqrt{2}$ times the natural frequency. Figure 3 shows the frequency spectrum for a typical loaded isolator.

The foregoing emphasizes the importance of the dynamic stiffness of the mount. The drift of the mount under load is also an important characteristic because excessive drift may cause misalignment of the sup-

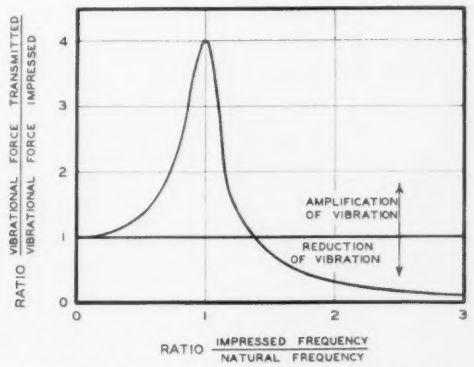

FIG. 3—Frequency spectrum of typical loaded mount.

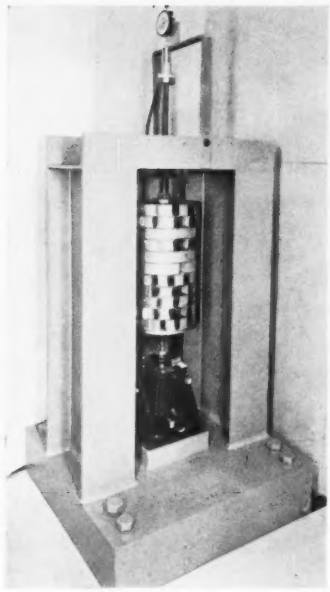

FIG. 4—Mount supporting 300-pound load attached to vibration exciter.

ported equipment and reduce the clearance between the metal parts of the mount. If the latter happens, the metal parts may contact when the impressed frequency corresponds with the natural frequency, or when the system is subjected to shock.

Methods of Testing

Three mounts were tested, one at each of the following temperatures: 30°, 82° and 145°F. The testing consisted of the operations listed below:

1. The mount was fastened on a very rigid stand in such a manner that the axial vibration of the mount would take place in a vertical direction.
2. A threaded rod with bottom plate was suspended from the mount to support the load.
3. Slotted lead weights were placed on the support at one-minute intervals until the suspended load totaled 300 pounds; meanwhile the deflection of the mount caused by each increment of load was noted. This operation was performed at 82° ± 5°F.
4. The natural frequency of the loaded mount at 82° ± 5°F. was found one hour after loading to 300 pounds. This was done by shaking the 300-pound weight vertically through a range of frequencies around 15 cycles per second, with constant peak force of 5 pounds, while measuring the amplitude of vibration.
5. The refrigeration or heating system was started if the mount were one of those being tested at 30°F. or at 145°F.
6. Twenty-four hours later, the natural frequency was again determined as in operation 4. By this time the mount had attained the test temperature if different from 82°F.
7. After stopping the vibration, the position of the suspended load was measured by means of the dial micrometer, and this measurement was repeated at intervals for a period of 126 days in order to determine the drift of the mount.
8. The natural frequency of the mount was determined at intervals of 21 days, using the procedure detailed in operation 4.

The apparatus shown in Figure 4 was used for the test at 82°F. This unit was placed in a constant-temperature room, where the ambient temperature was controlled at 82° ± 5°F. The loaded mount was vibrated by means of the electromagnetic shaking device which appears below the lead weights in the photograph. The moving coil of this shaking device was bolted directly to the bottom of the threaded rod which held the lead weights. The amplitude of vibration of the mount was determined by means of a piezoelectric accelerometer fastened to the top of the threaded rod.

For testing at 30°F. the apparatus shown in Figure 4 was enclosed in a cork-insulated chamber, which also contained a refrigerated heat exchanger and two electric fans to circulate the cold air. The air temperature in the chamber was maintained at 30° ± 2°F. by means of a thermocouple-actuated instrument which controlled the starting and stopping of a refrigeration compressor. The thermocouple was located in the immediate vicinity of the mount.

For testing at 145°F. the apparatus shown in Figure 4 was enclosed in an asbestos-insulated chamber which contained two resistance heaters and two fans. The shaking device was located in a tunnel open to the outside air to protect the electrical insulation in the shaking device from damage by heat. The air temperature in the chamber was maintained at 145° ± 1°F. by means of a thermocouple-actuated instrument which controlled the flow of current to the resistance heaters.

The tests yielded the following information:

1. The relation of actual natural frequency of the vibrating system at 82°F. to the natural frequency calculated from the static deflection of the mount.
2. The effect of cooling the mount to 30°F. and effect of heating the mount to 145°F. on the natural fre-

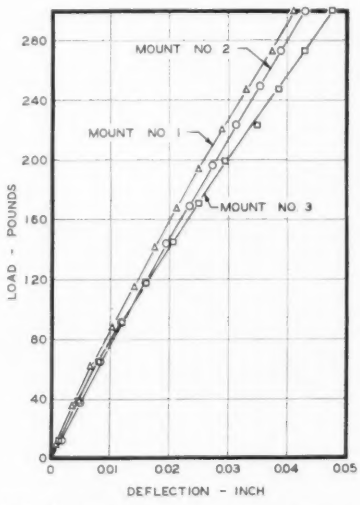

FIG. 5—Load-deflection curves of neoprene mount obtained at 82°F.

TABLE I—COMPARISON OF NATURAL FREQUENCY CALCULATED FROM DEFLECTION WITH MEASURED NATURAL FREQUENCY AT 82°F.

Mount No.	Deflection under 300 lb. load (inch)	Calculated Nat. Freq. (cps)	Measured Nat. Freq. (cps)	Difference (%)
1	0.0412	15.4	18.2	18
2	.0432	15.0	18.2	21
3	.0477	14.3	16.6	16

quency of the vibrating systems and on the dynamic stiffness of the respective mounts.

3. The effects of maintaining mounts under load for 126 days at 30°, 82° and 145°F., respectively, on natural frequency and dynamic stiffness.

4. The extents of drift of loaded mounts at 30°, 82° and 145°F.

Calculated vs. Measured Natural Frequencies

In the case of isolators which obey Hooke's law, i.e., those isolators which deflect in proportion to the loads supported, equation (1) can be simplified so that only the deflection of the mount by the load is needed to calculate natural frequency. The simplified equation is as follows:

$$f_n = \frac{1}{2\pi}\sqrt{\frac{g}{d}}$$

where d = deflection of mount in inches.

This equation gives accurate results for steel springs and fairly accurate results for shear-type mounts made from natural rubber. Manufacturers of mounts often suggest that their customers use this equation when selecting mounts for specific applications. The validity of this equation for the neoprene mounts investigated here can be found by comparing the calculated natural frequencies with the respective measured natural frequencies.

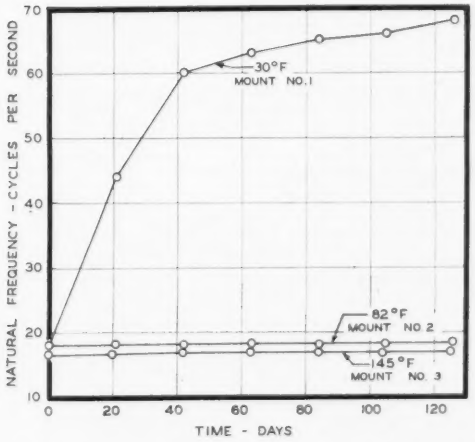

FIG. 6—Effect of time and temperature on natural frequency of neoprene mount supporting 300 pounds.

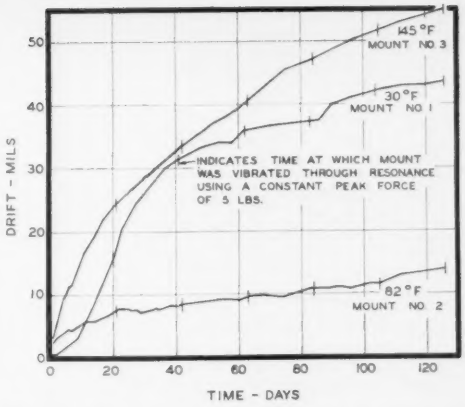

FIG. 7—Effect of temperature on drift of neoprene mount supporting load of 300 pounds.

The static load-deflection curves at 82°F. for the three supposedly-equivalent neoprene mounts tested in this investigation are shown in Figure 5. The mounts were found to differ somewhat in static stiffness; the percent difference between the deflections under a 300-pound load of the softest mount and of the stiffest mount was 16%. The calculated natural frequencies and measured natural frequencies at 82°F. are given in Table I. The calculated values are 16 to 21% lower than the corresponding measured values.

One reason for the differences between calculated and measured natural frequencies was the non-linear character of the respective load-deflection curves of these mounts as shown by Figure 5. The mounts did not obey Hooke's law. Another reason for the differences was the additional stiffening of the mounts during vibration caused by the internal viscosity or internal friction of the vulcanizate. Dynamic stiffness is the vectorial sum of static stiffness and stiffness due to internal viscosity. Thus, the dynamic stiffness of all isolators, even steel springs, is greater than their static stiffness. The magnitude of the difference is a function of the hysteresis of the isolator.

Effect of Temperature on Natural Frequency and Drift

Cooling to 30°F. and heating to 145°F. had little effect on natural frequency when the mounts were tested soon after attaining the respective test temperatures. The natural frequency of Mount No. 1 changed from 18.2 to 18.1 cps when the mount was cooled from 82° to 30°F. The natural frequency of Mount No. 3 changed from 16.6 to 16.1 cps when the mount was heated from 82° to 145°F. The lapse of time between these consecutive determinations of natural frequency, during which the respective mounts were being cooled or heated, was 16 to 24 hours.

Extended conditioning of the loaded mount at 30°F. resulted in a marked increase in its natural frequency, as shown in Figure 6. In a period of three weeks, the natural frequency increased from 18.1 to 44 cps. During the next three weeks the natural frequency rose to 60 cps. Eighteen weeks after beginning the test the natural frequency was 68 cps. The calculated dynamic stiffness of the mounting at the start of the conditioning period was 10,100 pounds per inch deflection; after 18

weeks at 30°F. it was 142,000 pounds per inch deflection.

The natural frequencies of the mounts conditioned at 82° and 145°F., respectively, increased slightly with time. In 18 weeks the natural frequency of the mount at 82°F. rose from 18.1 to 18.5, and that of the mount at 145°F. rose from 16.1 to 16.9.

The drift of the mount at 145°F. was considerable; in only 18 weeks it had drifted nearly 1/16 inch. The drift of the mount at 30°F. was not much less in this interval. The mount conditioned at 82°F. suffered only moderate drift in 18 weeks. These drift data are plotted in Figure 7.

Discussion of Test Results

The enormous increases in dynamic stiffness and natural frequency of Mount No. 1 with time at 30°F. were due to the gradual crystallization of the neoprene vulcanizate. The relaxation of the vulcanizate which occurred during crystallization was responsible for the excessive drift at this temperature. It was expected that this drift would be all recovered when the loaded mount was warmed to 82°F. after 18 weeks at 30°F. Actually, only 47% of the total drift was recovered. Total drift included drift during cooling from 82° to 30°F. (see following paragraph) plus drift at 30°F. The incomplete recovery at 82°F. of the drift which occurred at 30°F. indicated that the neoprene vulcanizate continued to be partially crystallized, even at 82°F.

The curve for drift at 30°F. in Figure 7 does not include the increase in mount deflection of 7 mils which occurred when the loaded mount was cooled to this testing temperature. This additional displacement was believed to be due in large measure to a decrease in molecular agitation, or entropy, in the resilient element, not involving crystallization. The decrease in molecular agitation, in effect, reduced the static stiffness of the resilient element. The opposite effect, that is, a decrease in mount deflection, would be expected in the case of the loaded mount which was warmed to 145°F. Actually, the deflection of this mount did not change. Apparently, sufficient drift occurred during the 24-hour warming period to compensate for any tendency to decrease in deflection.

Thermal shrinkage of the resilient element tended to increase the static stiffness when the temperature was lowered, and thermal expansion tended to decrease the static stiffness when the temperature was raised. Thus, the effect of thermal volume change on displacement of the load was opposite to the effect of entropy change, described above. Were it not for the thermal volume change, the displacement of the weight on cooling the mount would have been somewhat greater.

The marked increase in natural frequency of the loaded mount with time at 30°F. would make this mount practically worthless for isolating vibration. In fact, the frozen mount might actually augment the vibrational force of a machine, since the natural frequency of this mount is so high that it is of the same order of magnitude as the frequency of vibration of most machinery. If the frozen neoprene mount were vibrated through a considerable amplitude, such as would obtain if the vibrating system were held at its natural frequency and the supported equipment exerted considerable vibrational force, the neoprene would be warmed by its own hysteresis. The temperature of the mount might rise sufficiently to melt the crystalline portion of the neoprene vulcanizate, and thereby reduce its dynamic stiffness and the natural frequency of the system. Such severe mechanical working of the mount would not occur, however, in ordinary naval applications.

The peak driving force of 5 pounds used in this work vibrated the frozen loaded mount through a total excursion (double amplitude) of only 0.000103 inch at resonance. This extremely small movement had no noticeable warming effect on the mount.

Conclusion

It is concluded that Neoprene Type RT mounts should not be used for vibration isolation in applications where the mounts would be exposed for long periods of time to moderately high temperatures, because of excessive drift, or to moderately low temperatures, because of excessive drift and excessive stiffening.

ACKNOWLEDGMENT

The authors wish to express their appreciation to Harold Snyder and John Eynck of this laboratory for performing most of the measurements reported here, and to Roy Henderson of the Noise, Shock and Vibration Section, Applied Science Division, Bureau of Ships, for his interest in this investigation.

The Cost of Leaking Steam in Average Plants

IF you have a ¼-inch steam leak, it may be costing you $3500 per year. Thus, for example, if the diameter of the leaking aperture is ¼ inch, if the cost of the fuel is $6.00 per ton, and if the steam pressure is 320 lb. per sq. in. absolute, the loss will amount to $9.60 per day. In one year, leaking day and night continuously, the total cost would be $3,500, as you can easily figure.

Although steam does not always leak through round holes, it is nevertheless the general practice to compare and discuss leaks in terms of the round hole. Thus we may say of a leak: "It is equal to a leak through an eighth-inch hole", etc.

To compute the cost of a leak of this kind, here is a first-class rule: Square the diameter of the opening in inches, multiply that by the absolute steam pressure in pounds per square inch, then by the cost of fuel per ton in dollars, and then by 0.08. The result is the cost per day in dollars.

This rule is based on Napier's famous formula which tells us that to find the weight of steam flowing through a given orifice into the atmosphere per second we have merely to multiply the area of the orifice in square inches by the absolute steam pressure in lb. per sq. in. and then divide by 70.

In developing the above rule, it was assumed that one pound of fuel will evaporate six pounds of water.

W. F. S.

The Proper Selection of Transmission Belts for Use in the Rubber Industry

By NEWELL PERRY

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THE proper selection of a rubber transmission belt starts with a determination of the maximum horsepower to be handled by the belt. This is obtained by multiplying the rated horsepower of the driving unit (the name plate rating) by a service factor which represents the overload on the drive while starting. This overload varies with both type of drive unit and the type and use of the driven unit. Of course, consideration of the operating horsepower required by the driven unit has already entered into the selection of the horsepower of the driving unit.

A table of Service Factors (Table I) is offered here for equipment of the type found in the rubber industry together with a Horsepower Capacity Chart which is used to determine the horsepower delivered per inch per ply of belting. These two new aids to transmission belt selection are presented to assist power and process engineers who are now using lengthy calculations or inadequate approximations and interpolations to make important dollar decisions.

A proper belt is described in terms of width, W, and number of plies, P. Their product, WP, which represents the ply-inch of fabric in the belt necessary to carry the load is an important determination. This WP value is determined by dividing the chart value of horsepower per inch per ply into the total horsepower (including the starting Service Factor) involved, as in formula (1) below. Other considerations, such as the

TABLE I—SERVICE FACTORS

Applications	Electric Motors										Engines				
	A. C.								D. C.		Gas and Diesel				
	Squirrel Cage				Synchronous Single Phase										
	Normal Torque Line Start	Normal Torque Compensator Start	High Torque	Wound Rotor (Slip-Ring)	Normal Torque	High Torque	Repulsion and Split-Phase	Capacitor	Shunt Wound	Compound Wound	4 or More Cyl. Above 700 r.p.m.	4 or More Cyl. Below 700 r.p.m.	3 or Less Cyl. (Refer to Factory)	Steam	Line Shafts and Clutch Starting
Rubber Plant Machinery															
Calenders	1.4	1.4	1.4	1.4	..	1.8	..	..	..	..	..	..	..	2.0	..
Banbury Mills	1.4	1.4	1.4	1.4	..	1.8	..	..	..	..	..	..	..	2.0	..
Mixers	1.4	1.4	1.4	1.4	..	1.8	..	..	..	..	..	..	..	2.0	..
Agitators—Paddle-Propeller															
Liquid	1.0	1.0	1.2	..	..	..	..	..	..	..	..	..	..	..	..
Semi-Liquid	1.2	1.0	1.4	1.2	..	..	..	..	..	..	..	..	..	..	..
Compressors															
Centrifugal	1.2	1.2	..	1.4	1.4	..	..	..	1.2	..	1.2	..	..	..	..
Rotary	1.2	1.2	..	1.4	1.4	..	1.2	1.2	1.2	..	1.2	..	..	..	..
Reciprocating															
3 or more Cyl.	1.2	1.2	..	1.4	1.4	..	..	..	1.2	..	..	..	..	..	..
1 or 2 Cyl.	1.4	1.4	..	1.5	1.5	..	..	..	1.2	..	..	..	..	..	..
Fans and Blowers															
Centrifugal	1.2	1.2	..	1.4	..	..	..	..	1.2	..	1.2	..	..	..	..
Propeller	1.4	1.4	2.0	1.6	..	2.0	..	..	1.4	..	1.4	..	..	..	..
Induced Draft	1.2	1.2	..	1.4	..	..	..	..	1.4	..	1.4	..	..	..	..
Positive Displ. Blowers	1.6	1.6	..	2.0	2.0	2.0	..	..	..	..	1.6	..	..	..	..
Exhausters	1.2	1.2	..	1.4	..	..	..	..	1.4	..	..	..	..	1.5	1.5
Mills															
Pebble	..	1.4	1.6	1.4	..	..	..	..	..	1.4	..	..	..	..	1.6
Rod	..	1.4	1.6	1.4	..	..	..	..	..	1.4	..	..	..	..	1.6
Ball	..	1.4	1.6	1.4	..	..	..	..	..	1.4	..	..	..	..	1.6
Roller Mills	..	1.4	1.6	1.4	..	..	..	..	..	1.4	..	..	..	..	1.6
Flaking Mills	..	1.6	1.6	1.4	..	..	..	..	..	1.4	..	..	..	..	1.6
Pumps															
Centrifugal	1.2	1.2	1.4	1.4	..	..	1.2	1.2	..	..	..	..	..	..	..
Gear	1.2	1.2	1.4	1.4	..	..	1.2	1.2	..	..	..	..	..	..	..
Rotary	1.2	1.2	1.4	1.4	..	..	1.2	1.2	1.2	..	1.2	..	..	..	..
Reciprocating															
3 or more Cyl.	1.2	1.2	..	1.4	1.4	1.6	..	..	..	..	1.8	..	..	1.8	..
1 or 2 Cyl.	1.4	1.4	..	1.6	1.6	1.8	..	..	..	..	2.0	..	..	2.0	..
Line Shafts	1.4	1.4	..	1.4	1.4	2.0	1.4	1.4	1.4	1.4	1.6	..	..	1.6	1.6
Generator and Exciters	1.2	..	..	..	..	..	..	..	1.2	..	2.0	..	..	1.4	1.4

existing pulley face width and good belt proportioning (see Tables II and III) will dictate the selection of the actual width and the corresponding number of plies required by the WP product.

Any belt in the table of well-proportioned belts having the calculated WP product (or next above that calculated value) is satisfactory provided that pulley diameters are not too small (see Table II). In practice, the tendency is towards the widest possible belt for the projected drive so as to obtain the thinnest possible belt for greater flex life.

The WP product is given below:

$$(1) \qquad WP = \frac{HP \times \text{Service Factor}}{hp}$$

where WP = the required Width-Ply product,

HP = plate or rated horsepower of the driving unit, and

hp = horsepower capacity per inch per ply for the fabric selected at the belt speed and angle of belt contact involved. It is obtained from the horsepower capacity chart.

Belt speed, S, is determined as follows:

$$(2) \qquad S = 0.262 \times D \times rpm$$

where S = belt speed in feet per minute,

rpm = revolutions per minute of the drive pulley, and

D = diameter of drive pulley in inches.

Angle of belt contact is given by

$$(3) \qquad A = 180° - \frac{60\ (D-d)}{C}$$

where D = diameter of the larger pulley in inches,

d = diameter of the smaller pulley in inches, and

C = center-center distance between pulley in inches.

This formula gives the smaller angle of belt contact. If an idler is used, it is safe to estimate the belt angle from the position of the idler on the new belt (usually 10 degrees more than calculated above).

The Horsepower Capacity Chart is based on the following formula:

$$(4) \qquad hp = \frac{S\ (T_1 - T_c)\ (1 - 1/R)}{33000}$$

where hp = horsepower capacity per inch per ply,

T_1 = proper tight side tension for fabric involved in lbs.,

T_c = centrifugal tension in lbs $= \dfrac{W\,S^2}{3600g}$,

R = ratio of tight side to slack side tension $= e^{\mu\Theta} = \dfrac{T_1 - T_c}{T_2 - T_c}$

W = 0.03 lbs, the average weight of belting per inch per ply per foot,

S = belt speed in feet per minute,

g = the acceleration of gravity, 32.2 ft per second per second,

e = base of Naperian logarithm = 2.71828,

μ = coefficient of belt-pulley friction = 0.22 @ 180°,

Θ = angle of belt contact in radians, and

T_2 = slack side tension

This equation shows that belt horsepower depends upon and varies with speed angle of belt and coefficient of friction. It will be noted that the three curves of 28, 32 and 45 oz. fabric achieve horsepower maxima between belt speeds of 500 and 6000 feet per minute. Normal high speed is 4000 to 5500 fpm, medium speed is 3000 to 4000 fpm, and low speed is 2500 to 3000 fpm. Still lower speeds are possible but are often impractical.

A belt with the proper WP product and in good proportion according to Table III should be examined for flexibility by checking plies against pulley diameters in Table II. When pulleys are below minimum in diameter, the sizes of both drive and driven pulleys should be increased unless a thinner belt of heavier fabric will suffice. The normal pulley diameters of Table II will allow maximum belt life. As the diameter gets smaller, the tendency to fatigue the rubber and fabric, resulting in "bootlegging" and splice failure, also increases. Inasmuch as tension ratios tend to be less than 2.00 as the pulley size approaches the minimum limit in Table II (due to the application of more tension than actually required to do the job), the use of minimum size entails greater installation care to obtain maximum belt life and is not as safe.

TABLE II—PULLEY DIAMETERS VERSUS BELT PLIES

Rubber Belt Fabric Weights	Silver 35 oz. Hard Duck		28 and 32 oz. Soft Duck	
Number of Plies	Pulley Diameters in Inches			
	Minimum	Normal	Minimum	Normal
3 ply	4	7	4	6
4 ply	6	9	6	8
5 ply	8	12	8	10
6 ply	10	15	10	14
7 ply	12	18	12	16
8 ply	14	22	14	20
9 ply	16	26	16	24
10 ply	18	30	18	28

Note: Use normal diameters for best results. Pulleys larger than normal may be used.

TABLE III—WELL PROPORTIONED RUBBER BELTING

Standard Belt-Width (in.)	Minimum Plies	WP Value	Intermediate Plies	WP Value	Intermediate Plies	WP Value	Maximum Plies	WP Value
2	3	6	..	...	..	...	4	8
3	3	9	4	12	..	...	5	15
4	3	12	4	16	..	...	5	20
5	4	20	..	..	..	...	5	25
6	4	24	5	30	..	...	6	36
8	4	32	5	40	..	...	6	48
10	4	40	5	50	..	...	6	60
12	5	60	6	72	..	...	7	84
14	5	70	6	84	..	...	7	98
16	5	80	6	96	..	...	7	112
18	5	90	6	108	7	126	8	144
20	5	100	6	120	7	140	8	160
22	5	110	6	132	7	154	8	176
24	6	144	7	168	..	...	8	192
26	6	156	7	182	8	208	9	234
28	6	168	7	196	8	224	9	252
30	7	210	8	240	9	270	10	300
36	7	252	8	288	9	324	10	360
42	7	294	8	336	9	378	10	420
48	7	336	8	384	9	432	..	...
48	..	...	10	480	11	528	12	576

The Surface Coating and Impregnation of Fabric

(*Continued from Preceding Issue*)

By C. A. LITZLER
President, Industrial Ovens, Inc., Cleveland, Ohio

Evaporators and Fusers

After the application of the coating material to the web, solvents or fluid vehicles must be evaporated from the coating material and, in most cases, the material must be fused or polymerized and, in some cases, vulcanized to produce a final stabilized coating on the fabric. The normal means of accomplishing this heating operation is either by radiant energy or convection energy, which is applied in any one of the common heating methods.

Fuel or steam-heated air under forced convection handling is the most efficient method of heating web materials. This method of heating possesses many operational advantages not found in other methods. It provides a fluid heating medium that can be controlled accurately in temperature and directed in motion to provide a rate of heat transfer to the work as is required by that work. Likewise, it provides its own dilution of the explosive solvent vapors in air, thereby rendering them below the ignition or the explosive range. Convection heating has been applied in coating work only in the last few years. Other methods were in general use before that time.

Perhaps the most common evaporating unit is that which has been employed in the last thirty or forty years by the rubber industry, i.e., the old-fashioned steam table type spreader dryer. Originally, the freshly coated fabric was passed between horizontal rows of steam coils with little or no enclosure to contain or remove the evaporated solvent. As time went on, these open steam coils were enclosed in ventilated hoods which had the general appearance shown schematically in Fig. 20.

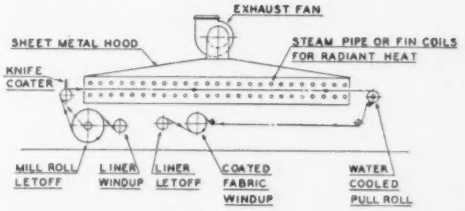


FIG. 20—Schematic arrangement of radiant type spreader.

Steam pipes above and below the web pass line supplied the original low temperature, radiant heat for evaporation. Temperature control was effected by control of steam pressures only. The evaporated solvents were contained in haphazard safety in a sheet metal enclosure which originally had only gravity exhaust. Later, these enclosures were equipped with a forced ventilating fan for the quick and safe removal of solvent vapors. No effort was made to improve the drying rate. Normal surface evaporation was used and, consequently, operating speeds were slow. Incidental movements of air, as caused by the system exhaust fan,

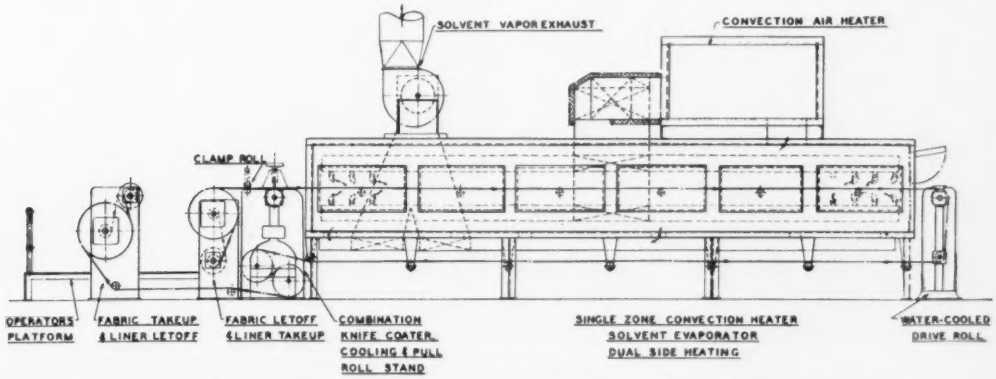

SOLVENT VAPOR EXHAUST
CONVECTION AIR HEATER
CLAMP ROLL
OPERATORS PLATFORM
FABRIC TAKEUP & LINER LETOFF
FABRIC LETOFF & LINER TAKEUP
COMBINATION KNIFE COATER, COOLING & PULL ROLL STAND
SINGLE ZONE CONVECTION HEATER SOLVENT EVAPORATOR DUAL SIDE HEATING
WATER-COOLED DRIVE ROLL

FIG. 21—Rubber spreader with full forced convection evaporator.

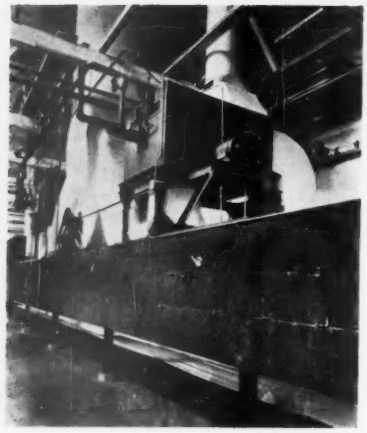


FIG. 22—Exterior view of single pass evaporator and fuser.

was the only attempt to try any degree of forced air movement.

There are still many hundreds of these spreaders in operation, but their number is gradually being diminished by equipment of more scientific and safe design.

The rubber industry has gradually accepted the use of convection type ovens for the evaporation of the volatile solvents. Engineering thought was applied to the thermodynamics of solvent evaporation and a convection dryer emerged as an efficient solvent evaporator. The general design of this type of convection evaporator is indicated in Fig. 21.

Essentially, these units are insulated enclosures with the necessary convection air heaters and internal duct systems. They are designed to provide a proper quantity of air, delivered at a known velocity over the coated fabric running through the zone. By control of velocities, temperatures and air directions, it is possible to increase the speed of the evaporation operation as much as 500% over the old radiation type spreaders. Thoughtful efforts were set forth to reduce the explosion hazard, and by proper dilution of the solvent vapors, safety of operation was obtained. An exterior view of a single zone spreader is shown in Fig. 22.

Vinyl Spreading

The preceding descriptions dealt specifically with two particular types of rubber spreader evaporators. There is still much rubber being spread on fabrics and, undoubtedly, rubber will continue to be used for such purpose. Advances will be made in the art and the equipment builder will keep pace with them. However, there is an increasing interest in the spreading of plasticized vinyls on fabrics or papers for the production of a host of materials extending from heavy upholstery cloths to disposable paper table cloths.

Plasticized vinyls are spread in two forms—solution or dispersion. The emphasis today is on the dispersion rather than the solution form. Fig. 23 indicates the design of a spreading unit of medium production capacity for the continuous production of plastisol-coated webs with coating weights up to approximately 10 to 15 dried ounces per square yard. No solvents or diluents are used.

In operation, the process is as follows: To provide continuous operation, the fabric is supplied from a conventional J-box to a coater pretensioning unit wherein the web is accurately pretensioned prior to coating. The coater, in a relatively simple installation of this type, is an adjustable knife coater with back-up belt with an additional spit knife. The fuser unit is a single zone, fuel-fired or electrically-heated straight fabric pass with upper and lower high velocity jet-type air impingement. Plasticizer vapors are continuously removed under pressure from the fusing unit. An embossed pattern or final bright finish is engrained on the fabric coating by means of a low pressure embossing unit.

Immediately after embossing, the fabric is cooled by passing around cooling rolls and then it travels through a storage accumulator and thence to a continuous take-up unit. Units of this type are simple to operate because the equipment contains a minimum of adjustment and requires a minimum of operator attention. It will produce a wide variety of plastic-coated, flexible end products.

The fusing oven portion of a system of this type is shown in Fig. 24. Controlled air velocity and direction are provided by multiple and adjustable ports which supply the heated air to either or both sides of the fabric to accomplish fusion heating in minimum time. Plasticizer vapor dilution of the heating air is accomplished as these vapors leave the coating surface. The removal of the plasticizer vapors from the system is accomplished as soon as these vapors have been formed.

In view of the design elements of evaporating and fusing units for coated webs, the simplicity of the fabric pass should be given serious consideration. Where possible, straight through passage of the fabric, either on a horizontal plane or over a flat roller arch, will produce an improved quality of fabric with a minimum amount of fabric wrinkling, draw-down or the subsequent final rejection of this fabric by the inspection

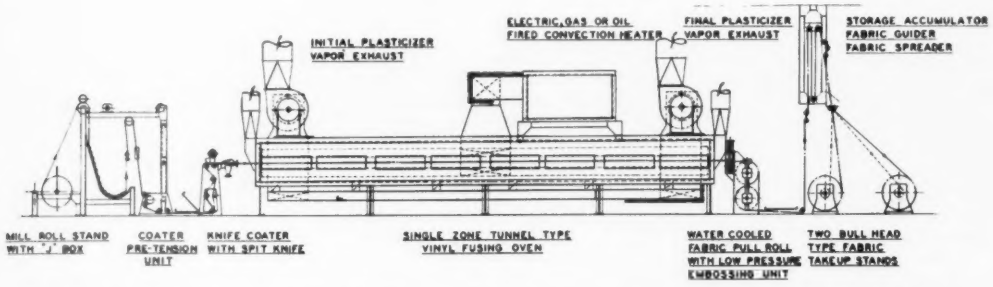

ELECTRIC, GAS OR OIL FIRED CONVECTION HEATER
FINAL PLASTICIZER VAPOR EXHAUST
STORAGE ACCUMULATOR
FABRIC GUIDER
FABRIC SPREADER
INITIAL PLASTICIZER VAPOR EXHAUST
MILL ROLL STAND WITH "J" BOX
COATER PRE-TENSION UNIT
KNIFE COATER WITH SPIT KNIFE
SINGLE ZONE TUNNEL TYPE VINYL FUSING OVEN
WATER COOLED FABRIC PULL ROLL WITH LOW PRESSURE EMBOSSING UNIT
TWO BULL HEAD TYPE FABRIC TAKEUP STANDS

FIG. 23—Vinyl paste coating unit with continuous low pressure embossing, continuous feed and take-up.

department. Most evaporators or fusers are furnished in this particular manner.

In most of the rubber or vinyl coating work being done today, there is a requirement for the evaporation of an explosive solvent, water or other suitable vehicles which carry the coating solids. The evaporation of water or explosive solvent presents no serious problem, providing the full extent of the solvent load, its make-up and its evaporation rate are known.

The elements entering into the design of an evaporating and/or polymerizing system are very precise and definite and they can be very accurately calculated from the well-known laws of heat transfer and convection principles. Practically all of the commonly used solvents have evaporating rates accurately established under standard conditions. This data is readily available in several excellent technical works on the subject. Combinations of solvents or little known or used solvents or diluents can be theoretically rated and this evaporation rate can be further checked in the laboratory.

The design of a system cannot be left to guesswork but must be accurately calculated, based upon the following factors:

(1) The heat load due to fabric or paper.

(2) The heat load due to solvent or plasticizer evaporation or change of state.

(3) The heat load due to radiation.

(4) The heat load due to coating solids.

These four factors properly extended to terms of Btu's-per-hour-load are converted into expressions of air volumes which must be circulated in the heating system. Based on the air thermal load in terms of cubic feet per minute and based upon the actual solvent evaporation, the total heat load of the system is calculated. The type of solvent and its allowable evaporation rate, the time the fabric is exposed to the drying air, and the impingement velocity of the air stream must be accurately calculated. Suitable air handling at the proper velocity at the point of contact with the coated fabric can increase the speed of the fusing by as much as 100%.

The most important consideration in the design of the solvent evaporation equipment is obviously the safe operation of the equipment. Based on the National Board of Fire Underwriters' Code, this condition requires the maintenance of a vapor concentration of 25% of the lower explosive limit of the solvent used.

The Oven Industry, through its own Safety Code Committee, has set up intelligent and stringent requirements which must be met in equipment design either to pass Underwriters' approval or to provide for safe operation of equipment of this type. This code is available to the entire industry and should be the basis of all solvent evaporating oven design.

Such conditions as the dampening of static electricity discharges are very important. The use of non-sparking construction is definitely required in most solvent applications. Ordinarily, the use of non-sparking materials increases the initial cost of the equipment, but it assures continuous, safe operating conditions throughout the life of the equipment.

In order to give a further idea of coating and evaporating loads that are encountered in a normal evaporating system, Fig. 25 indicates a series of lineal charts which have been developed by our Engineering Department for the rapid calculation of solvent loads and exhaust air volumes. Although the total amounts of solvents are directly proportional to coating rates and speeds and is easily calculated, the use of a chart of this type greatly minimizes calculation time involved in determining equipment requirements.

FIG. 24—Interior view of evaporator and fuser showing impingement jets.

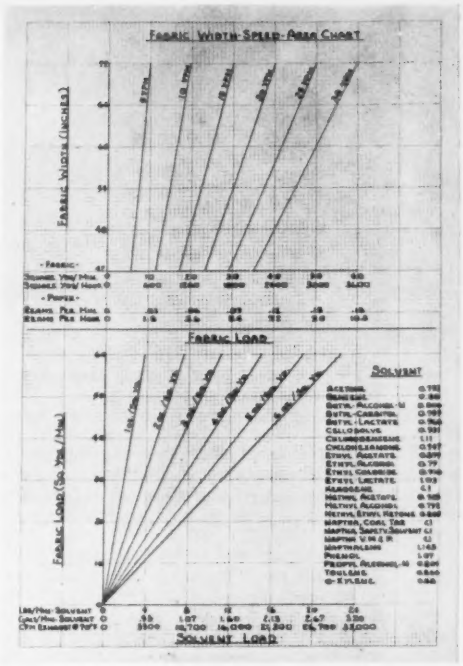


FIG. 25—Chart showing ratio of solvent load, fabric width and speed.

Other Handling Elements

When one considers a complete coating system, the coater and the evaporator or fuser are the two most important elements. The coater determines the accuracy of the wet film and the evaporator determines the rate of drying of that film. The smoothness of the final coat, however, is directly dependent upon the mechanical handling facilities that unwind the fabric and propel it through the system to the final wind-up.

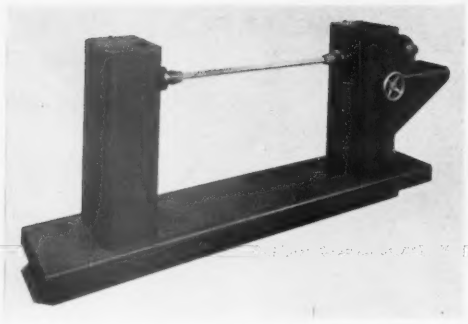


FIG. 26—Single roll let-off stand with range drive and side register base.

Coating speeds have increased in the past several years to a point where the let-off of the fabric and paper, in most cases, is continuous. Continuous unwinding is necessary because many of the coating operations cannot be stopped in process without damaging effects to the material that is left in the dryer or the coater during roll change time.

Suitable mill roll stands carry the original supply of uncoated fabric and pay it into the system at the velocity and tension level required by the process. These stands may be either single, individual stands for a single roll, dual stands for two rolls, or triple stands for three web rolls. These stands may be used by themselves, as a means of feeding the fabric, or they may be used in conjunction with storage accumulators or J-boxes.

A simple single roll mill supply stand is shown in Fig. 26. This particular stand is hydraulically driven and the drive receives its speed control impulses from either a fabric accumulator or from a tension control stand. It develops true constant tension and speed control. Where the fabric is continuously fed into a roll type storage accumulator, it is standard practice to provide a shifting base so that the material might be accurately positioned on the centerline of the accumulator. The shifter is operated manually through the handwheel depicted. Automatic centering is applied to the stand if the operating speeds of the fabric are very high or critical.

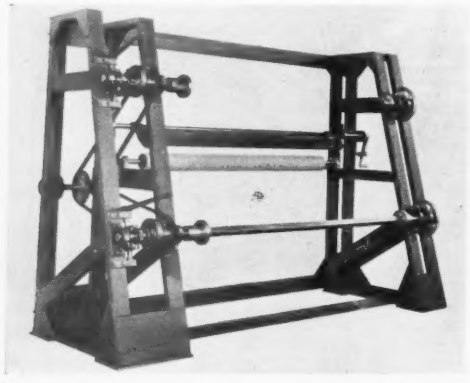


FIG. 27—Dual let-off stand for slow speed material.

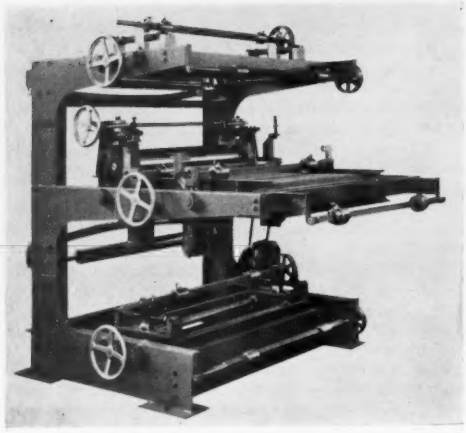


FIG. 28—Triple roll let-off stand for continuous multiple web impregnation.

With certain processes and speeds, it is quite possible to employ dual mill roll unwind stands as shown in Fig. 27. Principally, the stand is a frame supporting two sets of arbors which carry the two roll shafts. As one shaft is unwinding, a full roll is placed into the second unwinding position and the splice of the material is manually made at the end of complete runout of the roll. The accumulator or J-box continues to supply the fabric to the system at the going rate while the splice is being made.

It is sometimes necessary to provide for the continuous let-off of three separate webs simultaneously. In that case, and dependent upon the nature of the materials being unwound, triple unwind supply stands are used. Where required, these unwind stands are provided with unwinding drives which are an integrated part of the synchronous range drive of the entire system. The triple unwind stands may be either center unwind or they may be surface type unwind. The center web is surface unwound on a regular surface unwinding

FIG. 29—A typical fabric J-box.

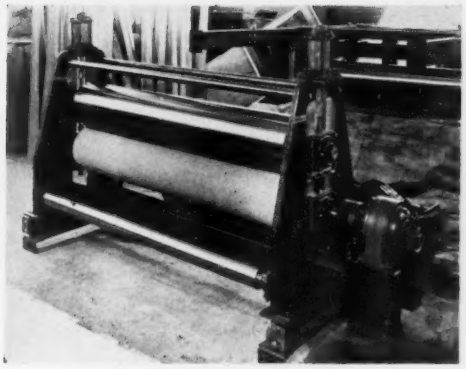


FIG. 30—Dual roll bullhead stand for medium back tensions.

FIG. 31—Triple pull roll stand for medium speeds and extremely high fabric tensions.

belt and the upper and lower rolls are center shaft unwound. All operations are at synchronous speed and constant tension. This stand is shown in Fig. 28.

Although the J-box is a standard adjunct in the textile industry, it has not yet been used as much as it should be in the coating industry. It is literally a storage bin in which the material is stored prior to going into the continuous process. The material is usually fed into the J-box at a greater rate than is required by the process so there is a supply of material built up and always present in the box for supplying the continuous operation. While a splice is being made to a new roll of material, the continuous process is fed from the material in the J-box. A typical fabric J-box is shown in Fig. 29. It is normally used in conjunction with J-box pull-out rolls and coater pretensioning devices which will be subsequently described.

Pull Roll Stands

After the fabric or paper has been coated and fused, it usually must be immediately cooled. In most cases, water-cooled pull rolls are used not only to cool, but also to propel the fabric through the system. Depending upon fabric speed, fabric tensions, temperatures and smoothness of fabric propulsion, either dual, triple or sometimes four-roll stands are utilized.

For the normal coating operation, dual roll cooling is sufficient for light webs running at medium to slow speeds. Such a roll stand is indicated in Fig. 30. Stands of this type are usually equipped with one rubber-covered roll and one water-cooled, chrome-plated roll. The rolls are provided with devices for parting the roll for passage of splices. The fabric passes around the two rolls in a single letter "S" wrap. Usually, the coated side passes the coated side in contact with the chrome-plated roll.

On roll stands utilizing two pull rolls, the rolls are usually provided with roll bite pressure systems. In low pressure bites, compressed air cylinders are employed to give nip pressures from 10 lbs. per inch of roll face to a maximum of 50 lbs. per inch. On coating operations, light pressures are employed. The pressure loading system is usually equipped with pressure regulating valves to vary the roll pressure to suit the requirement.

Fig. 31 indicates a heavy-duty, water-cooled pull roll stand for development of extremely heavy tensions in fabric. Because the developed tension is of a very high order, an inverted triangular roll pattern is used. In a stand of this type, the two upper rolls are in fixed mounting position. These rolls are provided with full water cooling and they are shell type, centrifugally cast bronze rolls. In order to provide the bite for fabric propulsion under heavy tensions, the center lower roll is rubber-covered and is hydraulically operated so that in its upper position it is tangent to the two top rolls under high pressure. In this manner a double letter "S" wrap of the fabric is accomplished. This provides maximum traction which is necessary for heavy tensions on fabrics with finishes of low friction coefficients. This type of roll stand is normally not used in fabric coating but is more generally used in fabric saturating or attenuating where the operating back-tension may extend to 15,000 lbs. across the fabric width.

For systems running at high speed on coated fabric with heavy coating deposition, four cooling rolls are required. In this case, a four-roll cooling stand is used. Three hundred degree wrap is provided on each of the centrifugally cast, shell type, bronze cooling rolls. These rolls are back-geared together to provide for maximum traction of the fabric. Roll diameter is approximately 24 inches. Roll stands of this type are normally used for speeds in excess of 40 yards per minute on 30 ounce total fabric and coating weight. The stand is illustrated in Fig. 32.

In the newer developments in the uses of vinyl dispersions and in the interest of economy of operation, light to medium pattern embossing has been combined with the fusing operation. This combination has increased embossing speeds and decreased embossing pres-

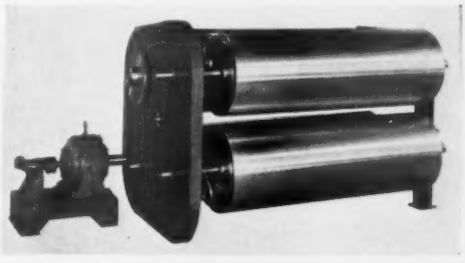


FIG. 32—Four-roll pull roll stand for high speed and medium fabric tensions.

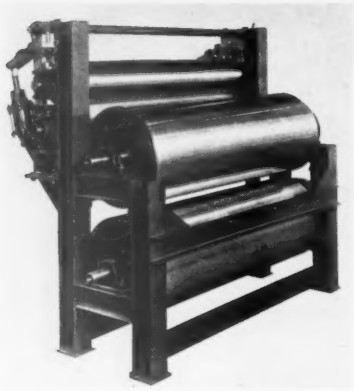


FIG. 33—Combination of dual pull roll and low pressure embossing stand.

sures to a point where separate embossing in heavy machines is not required except on very deep grains. The decrease in roll pressure is due to the relative softness of the vinyl coat because the vinyl coating at that point is at the fusing temperature, since it has just emerged from the fusing zone of the polymerizing oven. In fact, with this continuous method, full use of the heat of polymerization of the resin is put to use to provide a softened resin to the nip of the embossing rolls.

This combined embossing requires a relatively simple attachment to the cooling and pull rolls. It employs a water-cooled, rubber-covered, back-up roll and a water-cooled and pressure-loaded embossing roll. These rolls are arranged in a pressure stand so that normal factory air pressure, when applied to the unit, will provide a clean and well defined pattern. Pressures as low as 75 lbs. per inch of width at the nip produce excellent medium deep grain patterns. Normally, these low pressure embossers are built as adjuncts to either a two- or four-roll cooling stand. Embossing speeds of 30 yards per minute are very easily possible with this method of embossing. An embosser of this type is shown in Fig. 33.

After cooling, the fabric is usually passed through a web guide and a fabric expander and sometimes edge trimmers and then to the wind-up stand. Single wind-up stands, in conjunction with accumulators, are provided in a majority of cases to provide continuous fabric winding. The accumulator stores the fabric at process speeds while the new roll is started. Uninterrupted processing of the fabric is provided with this method of final wind-up.

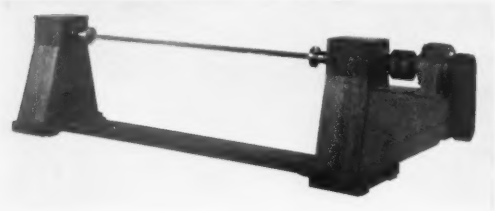


FIG. 34—Single roll bullhead type take-up.

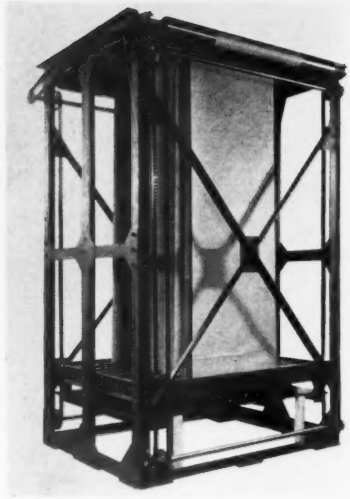


FIG. 35—A typical fabric accumulator.

Because of the many advantages of center winding, bullhead pedestal-type wind-up stands, of the type indicated, are used. Two of these wind-up stands are disposed as indicated in Fig. 34 and they are normally used in conjunction with a storage accumulator.

Fig. 35 indicates an accumulator with a nominal capacity of approximately 35 yards per minute. This allows adequate time for the back-end operator to make the fabric cut and to start the new roll with accuracy and care to prevent the wrinkling of the inner wrap. The accumulators are mounted either on the ceiling or on the floor so they are positioned close to the pedestal take-ups.

The accumulator shown is, in effect, a J-box which stores the material which the process machine delivers but which is not taken away during the roll change-over time. An accumulator differs from a J-box in that an accumulator imposes controlled tension to the material; a J-box does not. As the accumulator takes on

FIG. 36—Dual spindle take-up for medium speeds.

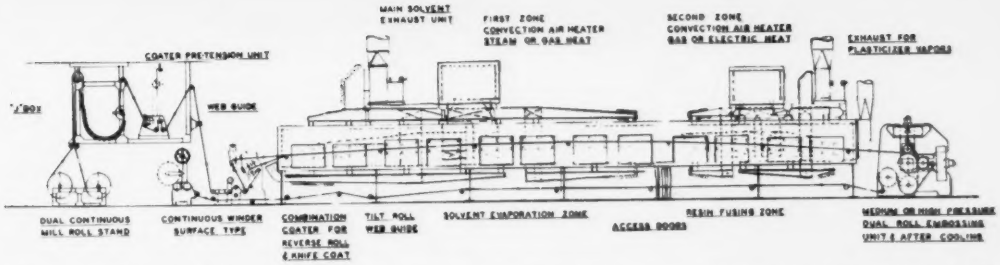

MAIN SOLVENT EXHAUST UNIT
FIRST ZONE CONVECTION AIR HEATER STEAM OR GAS HEAT
SECOND ZONE CONVECTION AIR HEATER GAS OR ELECTRIC HEAT
EXHAUST FOR PLASTICIZER VAPORS
COATER PRE-TENSION UNIT
"J" BOX
WEB GUIDE
DUAL CONTINUOUS MILL ROLL STAND
CONTINUOUS WINDER SURFACE TYPE
COMBINATION COATER FOR REVERSE ROLL & KNIFE COAT
TILT ROLL WEB GUIDE
SOLVENT EVAPORATION ZONE
ACCESS DOORS
RESIN FUSING ZONE
MEDIUM OR HIGH PRESSURE DUAL ROLL EMBOSSING UNIT & AFTER COOLING

FIG. 37—High speed continuous coating system with continuous high pressure embossing for organosols or solvent vinyl coatings on fabrics or heavy papers.

fabric, the movable roll cradle drops and absorbs the material. As it gives up material, the roll cradle rises. The differential movement of the cradle, raising or lowering as required by conditions, is used to operate volume valves, rheostats or saturable core reactors to control the speed of the wind-up stand motors. Precise speed and tension regulation are thereby provided.

For materials that are easy to cut, and when the speeds are sufficiently low, a dual take-up stand, such as shown in Fig. 36, is used. These particular stands provide for two winding spindles, each provided with disconnect clutches so that they can be clutched into or off the drive as is required. Dual spindle units are used with small capacity accumulators for fabric storage and tension control. Changeover from full roll to new core is manually accomplished "on-the-fly."

In some cases, surface type winders with flying shears are employed for the final continuous take-up of the coated fabric. Occasionally, roll contact continuous take-ups are used. Their use should be appraised in relation to mill roll size, fabric speed and the requirements for constant tension winding.

Organosol-Coated Webs

Up to this point we have discussed quite briefly many of the components involved in surface coating installations. In the next several paragraphs we will outline a complete installation such as would normally be used for the manufacture of organosol-coated webs of papers or fabrics. Some attention will also be given to the application of pressure-sensitive masses to paper or fabrics and to the type of coating equipment normally used for processing packaging material of paper, foil, and/or cellophane.

A complete installation for the processing of organosol-coated or solution vinyl-coated webs at high speed and under continuous operation throughout is shown schematically in Fig. 37. A study of this design will indicate the arrangement of general components in the line that have been previously described. Beginning at the left is a simple let-off stand, a J-box accumulator, a pull-out roll and tension stand, a reverse roll coater, an arch type, single pass, two-zone evaporator and fusing unit, a medium to high pressure embossing roll stand, and surface type winder. Installations of this arrangement run at production speeds of 40 YPM with 10 to 12 ounce dry coating weight on fabric webs up to 12 ounces per square yard. Because of the built-in arch in the evaporator and fuser unit, this system also can be used for the coating of paper weighing from 10 lbs. per ream upwards. For paper coating only, the system would be altered somewhat to provide a higher arch for the paper pass and suitable guide rolls for control of the paper trackage.

Fig. 38 indicates a modification of the same type of installation to be used only for fabric coating, continuous embossing and top coating after embossing for the manufacture of two-toned supported artificial leathers, heavy-gauge upholstering cloths, and similar end use fabrics. A rotogravure coater is applied to the back end of the system to apply a single coat of vinyl ink in contrasting color. A pattern roll is used in the inker to give a random top pattern to the material. Because the fabric is still warm from the embossing operation, the residual heat is used to dry the solvent from the ink. Where large areas are to be inked or if the residual heat in the fabric is deficient, a convection dryer is used to evaporate the solvent. By applying special inking attachments to the embossing roll itself, special effects, such as random pattern or simulated inlaid patterns, can be applied to the fabric. These are special machines and require special engineering care and consideration.

Another operation which requires the use of rather

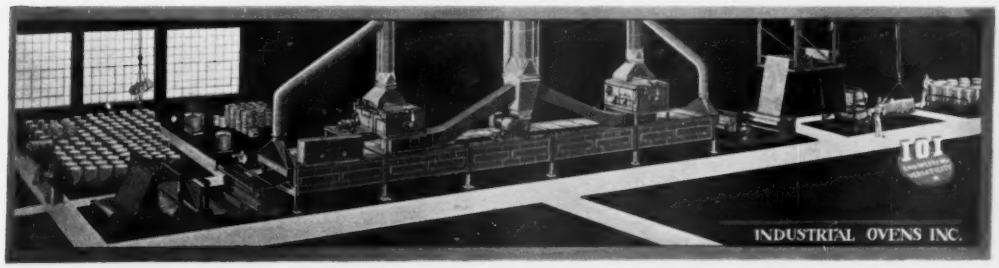


FIG. 38—A complete coating surface line with two-color printing on vinyl fabrics.

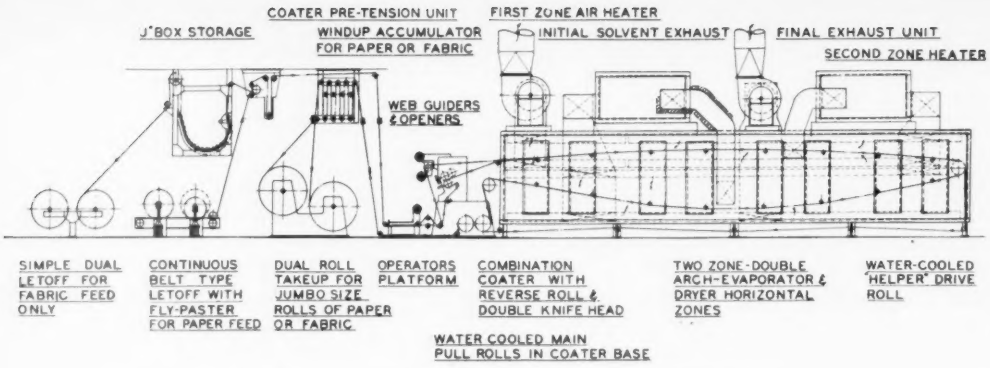

COATER PRE-TENSION UNIT
FIRST ZONE AIR HEATER
J'BOX STORAGE
WINDUP ACCUMULATOR FOR PAPER OR FABRIC
INITIAL SOLVENT EXHAUST
FINAL EXHAUST UNIT
SECOND ZONE HEATER
WEB GUIDERS & OPENERS
SIMPLE DUAL LETOFF FOR FABRIC FEED ONLY
CONTINUOUS BELT TYPE LETOFF WITH FLY-PASTER FOR PAPER FEED
DUAL ROLL TAKEUP FOR JUMBO SIZE ROLLS OF PAPER OR FABRIC
OPERATORS PLATFORM
COMBINATION COATER WITH REVERSE ROLL & DOUBLE KNIFE HEAD
TWO ZONE-DOUBLE ARCH-EVAPORATOR & DRYER HORIZONTAL ZONES
WATER-COOLED "HELPER" DRIVE ROLL
WATER COOLED MAIN PULL ROLLS IN COATER BASE

FIG. 39—Pressure-sensitive tape system for fabric or paper backing.

precise and accurate coating and handling equipment is the surface coating of paper- and fabric-backed pressure-sensitive tapes. Such an installation is shown in Fig. 39. Here again, variations will be noted of the same basic features of continuous feed, combination reverse roll and knife coating, a double arch type dryer, water-cooled pull rolls, wind-up accumulator, and continuous take-ups for jumbo sized rolls of coated tape. Because of the double arch construction and the arrangement for either single or double fabric passage, equipment of this type is sometimes used for coating paper or fabrics with the conventional type of rubber or synthetic rubber-type pressure-sensitive materials. For straight paper coating, the equipment must be ruggedly constructed and accurately manufactured. Such conditions as side frame deflection, machine vibration, bearing runout, gear back-lash and chain chatter must be positively eliminated.

The present trend toward packaged foods has increased the demand for coating and laminating systems for packaging materials. Laminations of foils, papers, films or combinations thereof are normally employed for these uses. Fig. 40 shows the general arrangement of a continuous rotogravure type coating unit, a continuous pull roll and a double laminating stand, together with the necessary web handling for both the laminate material and the laminant material.

As most of the coating operations of this type are on webs that are subject to edge curl, a shorter radius arch is employed. After pretensioning the material as it leaves the let-off stand, the tensioned web passes into a rotogravure roller coater and thence passes directly into a web dryer equipped with a radiant-heated preliminary solvent evaporation zone. This zone is supplied with both radiant type heating elements and a separate convection air system for supplying the make-up air to compensate for exhaust air losses and solvent vapor dilution. The secondary heating zone or the final fusing or polymerizing zone is approximately two-thirds the length of the entire dryer. Higher temperatures are used in this zone to accomplish fusion of the adhesive.

A triple roll laminator with wormwheel applied pressure is used as the laminating roll and the cooling rolls. The rolls are water cooled. The pressures employed to laminate are in the order of 100 to 300 lbs. per inch of material width. Operations of this type are normally conducted at 200 to 800 feet per minute, depending upon the type of coating material applied and the laminant material being combined.

Due to the high processing speed of this operation and the low tensile strength of the web handled, the laminating operation requires carefully designed equipment and inter-related system drives. One of the inherent problems is the design of sensitive, low inertia tension and speed synchronizing elements. The elements must be responsive to small increments of tension and speed change. The thermal and air capacity in the system must be adequate to provide maximum web speeds without over-drying the webs. First zone solvent evaporating capacity must be suitably designed to prevent skin drying or blistering of the adhesive mass.

(To Be Concluded)

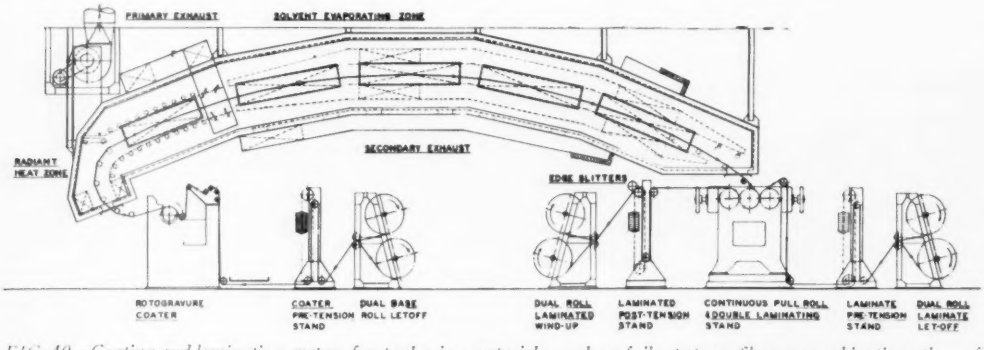


FIG. 40—Coating and laminating system for packaging materials, such as foils, papers, films or combinations thereof.

New Hose Testing Machine Features Adjustability Over Wide Range

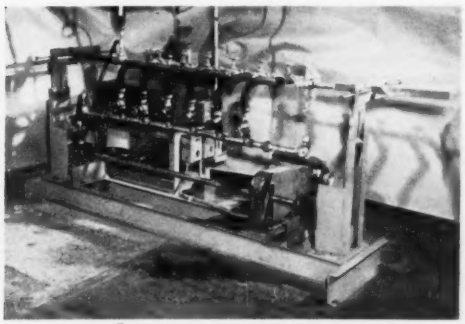
THE search for a suitable ready-made machine for testing rubber hose, particularly automobile radiator and heater hose, convinced the Thermoid Company, Trenton, N. J., that one could be built more exactly suited to their needs and at a lower cost in their own shops. The company did just that. The new machine is designed to test automobile radiator hose, six at a time, for resistance to flowing liquids, under various conditions of pressure and temperature. At the same time, the machine oscillates the hose to simulate automobile vibration.

Adjustable for Wide Range Testing

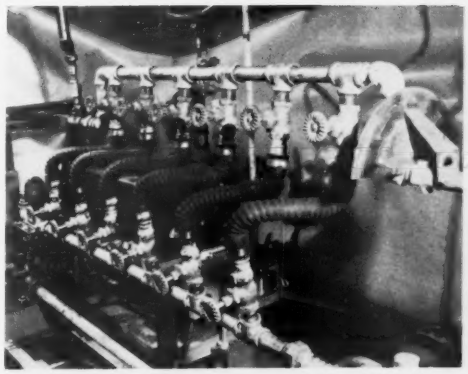
Built under the direction of Mr. Wilbur Huff, the new machine was recently placed in operation for the first time in Thermoid's Physical Testing Laboratory in Trenton. Readily adjustable to test a wide range of hose diameters, lengths and curvatures, the new machine is six feet long, four feet wide and five feet high in minimum dimensions.

The liquid under test is heated in a 10-gallon tank to a predetermined temperature up to 220° F., and is supplied to the system under pressures ordinarily encountered in automotive applications. The liquids are pumped from the tank to an upper manifold, of 1 in. diameter pipe, to which six outlets, each controlled by a gate valve, are fixed. The upper manifold is built to provide a vertical range of adjustment of 18 in., a horizontal range of 12 in. and angular adjustments through 180°, all relative to the lower manifold. The machine is sufficiently flexible to test hose of any ordinary length or degree of curvature.

The lower manifold also has six outlets, each fitted with a gate valve, so that hose being tested conveys liquids from the upper to the lower manifold. The lower manifold is mounted on two revolving discs drilled to provide five increments of eccentric motion to the lower manifold. The machine is presently equipped with discs with mounting holes drilled 1", ⅞", ¾", ⅝" and ½" from the center of rotation. By simple pulley changes, a wide variety of rotating speeds can be obtained. Additional rotating discs are available to provide other degrees of eccentric motion.



Over-all view of the new radiator hose test machine designed and built by the Thermoid Co., with six of the company's Redi-Curv hose being tested simultaneously.



Close-up view of the new hose test machine. In this view six Redi-Curv hose are on test with vertical adjustment in the lowest position.

Liquids Continuously Recirculated

Liquids are continuously recirculated through the system. A regular hose, not under test, runs from the pump to the end of the upper manifold. Because of the valves, any number of hose, up to six, can be tested at once. The liquid passes through the hose or hoses being tested to the lower manifold and back to the tank through a standard hose.

Because six hoses of the same type can be tested at once under the same conditions, the average performance of a given hose type can be determined with an accuracy not obtainable when testing one hose at a time. In practice, the six hoses are run until the first one fails. The valves controlling this hose are closed and the test is continued until the performance of all six have been determined.

Thermoid eventually plans to set up tests for all hose types in which the temperature of the liquid, pressure, eccentricity of movement, and the liquid itself will be standardized.

Built at an estimated cost of $3,000, the new hose testing machine is rugged and easy to set to test a wide number of variable factors. Designed and built entirely within Thermoid's organization, the new machine will be of great value in developing new hose constructions, designs and rubber compounds to resist corrosion from anti-freeze liquids and structural failure from vibration.

Editorials . . . . . .

Working Party

ONE of the actions taken by the International Rubber Study Group at its ninth meeting, which was held in Ottawa, Canada, during the week of May 9, was the establishment of a "working party." This special group was charged with the following: "To consider whether the measures designed to prevent burdensome surpluses or serious shortages of rubber are necessary and practicable; to prepare drafts of any agreements required to implement such measures, and to report back to the Study Group as soon as possible." Membership in the "working party" was left open to all members of the Study Group who wished to be represented on it.

Immediate vocal opposition to the organization of the "working party" was made by several prominent rubber executives attending the Ottawa meeting, particularly John L. Collyer, president of the B. F. Goodrich Co., and Harvey S. Firestone, Jr., board chairman of the Firestone Tire & Rubber Co. Mr. Collyer stated that the U. S. Government "has no business participating in any international agreement on rubber or in a cartel arrangement of any kind." He alo asserted that such steps would force the United States "further along the road to socialism." Mr. Firestone expressed the opinion that progress in rubber, both for producers and consumers, can best be attained by expanded markets for rubber products rather than by new controls.

Despite the registered opposition to its existence, the "working party" held its first meeting in London, England, beginning late last month and extending into the early part of the current month. Although the meetings of the International Rubber Study Group and those of its sub-groups, such as the "working party," are closed to the press and public, it is obvious that the formation of the group under discussion was a project pushed by the producers of natural rubber. Although the major producers are in complete agreement insofar as the need for the "working party" is concerned, they seem to be worlds apart with regard to proposed methods of achieving "security."

According to experts in close touch with both producing and consuming interests, the Indonesians and the Ceylonese are pressing for adoption of an output restriction scheme for both natural and synthetic rubber. This scheme would follow in broad outline the terms of the International Rubber Regulation Agreement which existed prior to World War II, with the exception that it would now include synthetic rubber. At current market prices, there is an approximate seven-cent differential between natural and synthetic rubbers, in favor of the synthetic material, and these producers are said to fear a narrowing of that margin as soon as the U. S. stockpiling program is brought to a complete halt, with lower prices prevailing for natural rubber.

On the other hand, the British Malayans, adopting a much more realistic attitude, are urging the United States to narrow the existing margin by raising the price of GR-S. These producers claim natural rubber can readily compete with American synthetic if the price of the synthetic was more truly representative of actual cost, or, in other words, if tax and interest burdens were added to the present selling price. In this respect the Malayan producers find a sympathetic audience in some branches of our domestic rubber industry, particularly the rubber reclaimers who also must compete with GR-S on a price basis which they consider unfair.

Just prior to the meeting of the "working party" in London, Mr. Collyer issued No. 14 in the series of rubber studies made by Goodrich under the general title of "The Rubber Outlook." This latest study was subtitled "A Study of Cartels and Their Consequences," and contained six conclusions, as follows:

1. There will be a market for all of the crude rubber which can be produced at a price competitive with the principal man-made rubber, American GR-S.

2. There is little likelihood of a burdensome surplus of crude rubber.

3. Except in the event of another World War, serious shortages of rubber can be prevented by increasing the output of man-made rubbers.

4. A cartel to prevent surpluses or shortages is unnecessary.

5. A cartel to regulate the output of crude rubber would increase production costs and would ultimately cause the consumption of crude rubber to decline.

6. A cartel to regulate the output of all kinds of rubbers could not be organized during this period of international tension.

The American Government is fully aware of the necessity of helping to maintain the economy of Southeast Asia, which is so closely identified with the cultivation and sale of natural rubber. However, based on the experiences of the previous rubber cartels—the Stevenson Scheme and the International Rubber Regulation Agreement—it is extremely doubtful that it will even entertain any new proposition for a world-wide agreement on rubber in any manner, shape or form. Increasing the selling price of GR-S to more nearly reflect true production and selling costs is, however, within the realm of possibility.

NEWS OF THE MONTH

NPA ANNOUNCES NEW AMENDMENT TO ORDER M-2 AS RFC PLANS PROGRAM FOR SYNTHETIC RESEARCH

THE National Production Authority, in an amendment to Rubber Order M-2, effective July 22, removed restrictions on the use of high tenacity rayon for rubber products and announced changes in other controls on synthetic and natural rubber. As a result of this action and recent amendments, most of the controls regulating the acquisition and consumption of natural and synthetic rubber have been removed. However, restrictions on the use of natural crepe rubber and limitations on the purchase of dry cold GR-S were retained. At the direction of DPA, as announced when Order M-2 was amended April 21, 1952, minimum consumption levels of synthetic rubber necessary for security reasons have been set by NPA. Should consumption fall below the minimum rates of 450,000 long tons of GR-S (including the oil weight of oil-extended GR-S) and 60,000 long tons of Butyl, it would be necessary to amend M-2 to establish industry-wide manufacturing specifications requiring the use of a stated percentage of synthetic rubber in all rubber products.

Removal of restrictions on the use of high tenacity rayon for rubber products is possible because total production is sufficient to satisfy total demands, E. D. Kelly, director of the Rubber Division of NPA, said. The production capacity has been increased over the base period use of 316,000,000 pounds annually. It is believed the relaxing of controls on the use of high tenacity rayon will increase the civilian supply and help small business and the export trade. Requirements for defense and defense-supporting activities will be assured by an amendment to Direction 3 to NPA Regulation 2 to assure defense order priority ratings for high tenacity rayon. In brief then, the new amendment to Order M-2 accomplishes the following:

(1) Changes the definition of natural rubber to include all grades of wild rubber. Balata, gutta percha, and reclaimed natural rubber are excluded.

(2) Revises and clarifies the definition of synthetic rubber to exclude certain chemicals with rubberlike properties which are not considered synthetic rubber under provisions of Order M-2.

(3) Changes in the definition of RHC (rubber hydrocarbon) to include the oil in oil-extended GR-S so that "new RHC" means total new rubber hydrocarbon. Mr. Kelly explained that the Rubber Division had encouraged the use of rubber resulting from a combination of cold GR-S and various oils by excluding the weight of the oils in total weight computations for control purposes. The change in the definition is in accord with relaxation of controls and the establishment of the technical value of oil-extended synthetic rubber.

(4) Eliminates the prohibition on private importation of natural rubber. Removal of this section is a technicality as the provision expired by its own terms on July 1, 1952 on dry natural rubber and by specific amendment to Order M-2 on June 16, 1952 on natural rubber latex. The General Services Administration had dissipated all government-owned stocks of latex and returned importation rights of natural rubber to private hands.

(5) Establishes for the third quarter, and for subsequent quarters, 70% as the percentage of dry GR-S which may be purchased from the RFC in the form of dry cold rubber.

(6) Removes uncured scrap rubber from the types which must be included in the monthly reports. This information is no longer necessary as the rubber consumed in the production of the scrap has been reported by the manufacturers.

(7) Removes the requirement for special reporting by importers of natural rubber latex. As latex importers are no longer required to offer part of their receipts for sales to the government stockpile, the report is unnecessary.

NPA, in an amendment to Regulation 1, dated July 23, also revised its inventory controls over a list of commodities including GR-S and Butyl rubbers. As of the aforementioned date, GR-S and Butyl were deleted from inventory controls.

Approves Research Program

On July 28, Administrator Harry A. McDonald announced that the Reconstruction Finance Corporation has approved a $6,500,000 research and development program on synthetic rubber for the fiscal year ending June 30, 1953. This program is a continuation of work that has been carried on in the past, as authorized by Congress, to maintain a technologically advanced and rapidly expandable domestic rubber-producing industry adequate for national defense and essential civilian requirements.

During this fiscal year emphasis will be on improving the quality of synthetic rubber for more extensive use in large-sized tires, on improving the quality of cold rubber latex, and on assisting national defense groups in their search for improved synthetic rubber for special purposes. Fundamental research at universities and elsewhere in the program originates and clarifies scientific ideas for new polymers, which are developed in industrial and government pilot plants, tested in evaluation laboratories and on the government tire test fleet, and introduced into commercial production. RFC research and development is integrated with synthetic rubber production activities and is constantly made aware of the consuming industry's requirements, which assures a helpful practical review and guidance for the program.

The current research program will be conducted for RFC by eight industrial organizations operating GR-S production plants, by the government laboratories operated by the University of Akron, by a government tire test fleet at San Antonio, Texas, by the National Bureau of Standards, and by ten universities, institutes and other research organizations.

Participating Organizations

The industrial organizations participating in the program are the Copolymer Corp., Baton Rouge, Louisiana; Firestone Tire & Rubber Co., Akron, Ohio; General Tire & Rubber Co., Baytown, Texas; B. F. Goodrich Chemical Co., Akron, Ohio; Goodyear Synthetic Rubber Corp., Akron, Ohio; Kentucky Synthetic Rubber Corp., Louisville, Kentucky; Phillips Petroleum Co., Borger, Texas, and United States Rubber Co., Naugatuck, Conn.

The universities, institutes, and other organizations cooperating in the research are the University of Akron, Akron, Ohio; Burke Research Co., Detroit, Michigan; Case Institute of Technology, Cleveland, Ohio; University of Chicago, Chicago, Illinois; Cornell University, Ithaca, New York; University of Delaware, Newark, Delaware; University of Illinois, Urbana, Illinois; Massachusetts Institute of Technology, Cambridge, Massachusetts; Mellon Institute, Pittsburgh, Pennsylvania, and University of Minnesota, Minneapolis, Minnesota.

The best-known product of the research to date has been cold rubber, a type of GR-S synthetic rubber produced at 41° F. (5° C.) which can be compounded into tires to give treadwear considerably better than natural rubber. The most important recent product of the program is oil-masterbatched GR-S, which is based on the addition of rubber processing oil to highly viscous synthetic rubber during an intermediate manufacturing stage. As a result, the final product, of normal viscosity, has in effect been oil-extended without detriment, but rather with benefit to its physical properties. During the past year the following were among the most noteworthy accomplishments of the research program:

(1) Oil-masterbatched GR-S was developed to the point where it has become an established production item because of a demonstrated 10-20% improvement in treadwear performance over cold GR-S at a substantial reduction in tire cost. This product also provides an expansion in apparent rubber supply with a minimum expenditure of raw materials and equipment.

(2) The development of a process using a so-called "Alfin" catalyst originated at the Massachusetts Institute of Technology. The process was successfully carried out on a continuous pilot plant scale in the government laboratories at Akron, Ohio, and substantial quantities of high molecular weight Alfin polymers were prepared for evaluation in tires and other essential products. Rubber experts point out that Alfin polymers offer interesting possibilities because they are extremely tough and yet are free from the degradation constituent known as "gel."

(3) A type of GR-S approaching cold rubber in physical properties, but which can be produced in non-refrigerated equipment, was developed. The new synthetic is made by conducting polymerization of butadiene and styrene at a temperature of 122° Fahrenheit (50° Centigrade) rather than at the lower temperature of 41° F. (5° C.) which is used for cold rubber. Improved properties at the higher temperature of manufacture are achieved by the use of a new reaction system employing an aromatic nitrogen (diazo) compound, Nitrazole CF, as the catalyst. Pilot plant quantities of the new synthetic rubber prepared early in 1951 showed promising results in road tests on the government tire test fleet.

Experimental Run Made

During late 1951 an experimental commercial run of the product was made in the RFC synthetic rubber plant at Akron, Ohio, operated by Firestone for the Government. Tests of the new synthetic on the government fleet totalling 600,000 tire miles, together with results reported on private tests, lead to the conclusion that it is definitely better for treadwear than hot rubber, and possibly equal to cold rubber. The new synthetic apparently obtains its improved properties by virtue of a superior molecular weight distribution which is achieved by the new catalytic system rather than low temperature polymerization. This development increases the productive flexibility of the government-owned synthetic plants, because if full consumer acceptance of the new product is obtained on such matters as processibility, the hot rubber capacity of the plants can be directed to the manufacture of an improved product.

Experts believe it possible that further research and development may enable the new type of polymerization to be utilized for the production of synthetic rubber in cold rubber plant equipment so that a product even better than the present cold rubber may be eventually realized. The results of research from all participants in the program are published as rapidly as they can be technically edited. During the past year 94 articles were published in scientific or technical papers, RFC said.

RFC formulates the over-all research program each year and with the aid of interrelated committees develops detailed plans, maintains a balance among the fundamental, applied, and developmental research work and facilitates a continuous exchange of research findings. The general objectives are to make synthetic rubber better and cheaper, and to produce it more efficiently.

Sets New Oil-Polymer List

RFC, on June 27, issued a memorandum in which it was proposed that certain oils, or their equivalents, be incorporated in specific polymers. This was done in order to recognize the viewpoints of industry members who questioned the complete interchangeability of Circosol 2XH, Shell SPX-97, Sundex 53 and Dutrex 20 in all polymers. RFC understood, at that time, that substantially all industry members agreed that Shell SPX-97 and Sundex 53 were interchangeable. Consequently, it was stated in the June 27 memorandum that these oils would be used interchangeably in certain polymers. RFC also proposed to eliminate Dutrex 20 from the program. Comments on these proposals were solicited.

Since that time, some companies have indicated that in their opinion certain of the oils are interchangeable, others say the oils are interchangeable in some but not in all respects, and still others indicate that while their tests to date indicate possible interchangeability of certain oils, they need more time for evaluation. Various companies have indicated excellent experience with Dutrex 20 and have asked that it be continued in the RFC program along with a possible equivalent, Califlux TT.

Accordingly, in order to allow consumers sufficient time to evaluate the aforementioned oils, it has been determined that effective July 25, 1952, RFC will manufacture the polymers set forth in the list which follows, until January 1, 1953. All permanent numbers previously assigned to oil and oil-masterbatch polymers were canceled as of July 25, and the polymers designated by the X numbers indicated in the listing.

On January 1, 1953, all X numbers which have the same base polymer, and equal quantities of equivalent processing oils, will be consolidated into a single permanent GR-S number which will incorporate the equivalent oils on an interchangeable basis. For example, it is indicated in the July 25 memorandum that Shell SPX-97 and Sundex 53 are equivalent. Consequently, unless this is disproven by factual technical data, on January 1, 1953, X-654 and X-712 will be consolidated into a permanent GR-S number in which these oils will be incorporated interchangeably. Likewise, X-706 and X-716 will be consolidated. Also, it is believed that Dutrex 20 is equivalent to Califlux TT. If this is so, X-700 and X-715 will be consolidated.

RFC said, however, that one point should be strongly stressed. That is, that all consumers are strongly urged to evaluate, as soon as possible, all of the aforementioned oils due to the fact that if the demand for polymers incorporating certain of the aforementioned oils becomes insufficient to warrant economical production, it may be advisable to discontinue their production. A careful and rapid determination of the most desirable oils will expedite investigations at higher oil levels and speed the development of more suitable oil-black masterbatch polymers.

It will be noted that RFC has standardized the oil contents of the various polymers at either 25, 37½ or 50 parts oil on 100 parts of base polymer. Also, it will be noted that with the exception of X-709 the Mooney viscosity of all base polymers has been standardized at 125 ML-4. RFC standardized the Mooney level in order to permit evaluation of other variables, such as the oils themselves, and adopted 125 ML-4 due to the fact that most industry experience has been obtained in oil-masterbatch polymers at this level. The higher 150 ML-4 base polymer Mooney for the 50 part oil polymer should be desirable to maintain finished polymer quality at lower cost. RFC is giving consideration to the establishment of Mooney specification limits on the finished polymers. The list of currenly manufactured oil and oil-black masterbatch polymers follows:

OIL MASTERBATCHES

X-628—25 parts Circosol 2XH + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-654—25 parts Shell SPX-97 + 100 parts

Last RUBBER RED BOOK Sold

Copies of the 1951-52 edition of the RUBBER RED BOOK are no longer available. The stock of this valuable directory of the rubber industry in the United States and Canada has been completely exhausted. Possessors of the 1951-52 edition are urged to share their copies with friends and business associates. Plans are proceeding for the publication of the 1953-54 edition. Until such time as the new edition becomes available, the staff of RUBBER AGE, publishers of the directory, stands ready to answer any inquiries concerning the rubber industry.

20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-712—25 parts Sundex 53 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-713—25 parts Sundex 53 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, rosin emulsified, carbamate shortstopped, 41° F reaction temperature, slightly staining stabilizer. Mooney of polymer 125 ML14.

X-714—25 parts Shell SPX-97 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, rosin emulsified, carbamate shortstopped, 41° F reaction temperature, slightly staining stabilized. Mooney of polymer 125 ML-4.

X-700—25 parts Dutrex-20 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-715—25 parts Califlux TT + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-716—37.5 parts Sundex 53 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-717—37.5 parts Circosol 2XH + 100 parts 20% bound styrene polymer, sugar-free, iron activated, rosin acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-706—37.5 parts Shell SPX-97 + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

X-693—25 parts Circosol 2XH + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, stabilizer Wingstay-S or equivalent. Mooney of polymer 125 ML-4.

X-718—37.5 parts Circosol 2XH + 100 parts 23.5% bound styrene polymer, peroxamine activated, fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, stabilizer Polygard or equivalent. Glue-acid coagulated. Mooney of polymer 125 ML-4.

X-709—50 parts Circosol 2XH + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, stabilizer Wingstay-S. Mooney of polymer 150 ML-4.

OIL-BLACK MASTERBATCH

X-629—50 parts HAF black + 25 parts Circosol 2XH + 100 parts 20% bound styrene polymer, sugar-free, iron activated, 50/50 rosin/fatty acid emulsified, carbamate shortstopped, 41° F reaction temperature, staining stabilizer. Mooney of polymer 125 ML-4.

Other Synthetic News

The Port Neches, Texas, GR-S plant operated by the Naugatuck Chemical Division, U. S. Rubber Co. for the government, is being converted from "hot" to "cold" rubber and its production capacity increased from 70,000 long tons to more than 100,000 long tons annually, the company announced recently. The conversion and expansion program is expected to be completed by late fall, barring any delivery bottlenecks in equipment and materials. It will cost approximately $2,500,000 and will make the Port Neches plant one of the most modern in the industry, the company said.

The increase in plant capacity is made possible by new fast-acting chemical formulae for GR-S rubber and by a new type of "chemical refrigerator" perfected by Naugatuck Chemical scientists. The "refrigerator," technically known as a heat exchanger, will carry away the heat generated during the chemical manufacturing process at a faster rate than has been possible with older equipment. This will cut the time needed to make the "cold variety" of synthetic rubber from a normal 14 hours to 8 hours. One of these heat exchangers will be installed inside each kettle-like reactor on the plant's four production lines. In addition, to increasing "cold" rubber production, the heat exchangers will lower the plant's unit operating costs.

GSA Maps Rotation Plan

As the RFC made plans for a program of synthetic rubber research, GSA officials took the first tentative steps toward working out a program for rotating the vast strategic stockpile of natural rubber. In letters to 22 leading rubber manufacturers and the Rubber Trade Association, GSA called for suggestions on how the rotation program should be handled. Along with the letter went a list of every lot of natural rubber which GSA can make available immediately under its rotation program.

The rubber listed for immediate rotation amounts to some 20,000 long tons, of which about 17,000 tons is of "non-storage grades". Much of this off-grade rubber was bought during the past year. The balance is older rubber, some of it here since the end of World War II, and which is now due for replacement.

GSA stated that it may be some weeks before it gets any calls to buy any of this rubber, and it doesn't know how long it will be before the present stocks are replaced in full. Private manufacturers, who bought some rubber in June, are said to hold excessive inventories of some grades and probably won't want to load up before they bring their own stocks into balance. Prices for the rotation stocks will be negotiated between GSA and the buyer. Purchases must be replaced soon after.

In its letter, GSA asked the manufacturers and the RTA for their comments on the agency's plan to deal directly with manufacturers on rotation. Some manufacturers have already replied that they don't have the facilities to buy rubber in the Far East to replace any taken from GSA.

As for the few large manufacturers who have Far Eastern buying agents, none have been heard from as yet, it has been reported. Neither have the rubber dealers made up their minds, although some were inclined initially to be chary of the idea. Their spokesmen are discussing the question with GSA.

GSA sees some enonomies in the plan, which the agency says is only in the suggestion stage. Some dealers see in the plan a possible loss of commissions. The rubber up for rotation now was all handled previously by the dealers, for a commission, operating under GSA during the exclusive buying scheme.

Before the exclusive buying period, all stockpile rotation transactions were handled through dealers. Whatever new system will be developed, and it may be some weeks before the rotation plan takes shape, that system will be the "most equitable that can be worked out by GSA with the trade and industry."

London Meeting Held

At a London conference late in July, a "working party", set up by the International Rubber Study Group at its general meeting in Ottawa earlier this year, met in an effort to find a way of stabilizing prices of natural and synthetic rubber. The meeting was called mainly at the insistence of small independent rubber-growing nations such as Ceylon and Indonesia.

These nations are said to fear an end to the U. S. stockpiling program will push their prices below profitable levels. They hope to press for adoption of an output restriction scheme for natural and synthetic rubber to brake the feared price fall, but few delegates expect to achieve such an agreement.

It has been reported that delegates representing British Malaya plan instead to try to talk the United States into boosting prices on its synthetic rubber. They say natural rubber could compete with synthetic on "fair" terms if the United States raised synthetic rubber's price to more nearly reflect the true tax and interest burdens that the government-owned industry would have to bear if it were privately owned.

Other News of Interest

NPA has disclosed that it will soon decontrol polyethylene in a revocation of Schedule 5 to Order M-45, the chemicals allocation regulation. Members of the industry advisory committee were told that the material can now be removed from allocation control because new facilities combined with reduced military requirements will provide sufficient supplies to meet all needs.

Under Amendment 3 to CPR 59, issued July 8, 1952, the Office of Price Stabilization has announced that wholesale rubber dealers are now permitted to buy, without ceiling price limitations, mixed lots of used tires and tubes offered for sale by U. S. government agencies whose disposal depots ordinarily classify reusable, recappable and scrap tires in a lot as "salvage". Under CPR 59, the entire lot had been classified as scrap.

G-E SILICONE RUBBER AVAILABLE TO FABRICATORS UNDER NEW PLAN

A new marketing approach on silicone rubber has been announced by the Chemical Division of the General Electric Co. The plan is designed to acquaint rubber fabricators with the techniques and formulations necessary to produce molding and extruding compounds on their own equipment from raw silicone gums. Heretofore, silicone rubber compounds were only available from the manufacturers of silicones, it was stated by Dr. C. E. Reed, general manager of the company's silicone operations.

General Electric's new approach now enables rubber fabricators to handle silicone rubber in the same manner as other synthetic and natural elastomers, Dr. Reed said, and offers important advantages to both the fabricator and his customers from the standpoint of faster service and greater flexibility of operation.

To expedite this program, which will enable silicone rubber to follow the production pattern established by other important synthetic rubber developments, General Electric is making available to rubber fabricators, a new G-E silicone rubber gum and detailed suggestions for converting the polymer to finished compounds, Dr. Reed declared. The new gum, SE-76, offers simple processability, excellent high- and low-temperature characteristics, and better all-round physical properties than former products, Dr. Reed observed.

SE-76 is being produced in the newly-expanded facilities of the company's silicone plant at Waterford, N. Y. With additional facilities now in production, plus the new compounding approach, the adoption of silicone rubber components in new market areas will be speeded, it was forecast by Dr. Reed. G-E will continue to offer a line of silicone rubber compounds for those fabricators who may prefer to work with pre-mixed materials.

Gaetz Named Factory Manager

Appointment of Howard R. Gaetz as factory manager of the Kankakee Unit, Joliet Arsenal, operated by the Naugatuck Chemical Division of the U. S. Rubber Co. for the U. S. government, was recently announced. Mr. Gaetz succeeded John E. Holquist, who was transferred to the division's Painesville, Ohio plant as plant engineer in charge of its expansion program. A graduate of the University of Alberta, Mr. Gaetz came to U. S. Rubber in 1942 with 10 years of chemical engineering experience both in the United States and abroad. His first position with the rubber company was production superintendent of the Pennsylvania Ordnance Works. He also served as production superintendent of the Kankakee Ordnance Works and the Institute, W. Va., GR-S synthetic rubber plant during World War II. In 1945, he was appointed factory manager of the Naugatuck, Conn., GR-S synthetic rubber plant. In 1949, Mr. Gaetz accepted an assignment with the Economic Administration in Korea, and when the Korean war broke out he returned to Naugatuck Chemical.

Firestone Transport Truck Tire

A new truck tire that is said to combine better traction for driving wheels and improved non-skid characteristics for braking wheels has been introduced by the Firestone Tire & Rubber Co. The new tire features a stronger gum-dipped cord body construction, a new, wider and flatter tread design, extra-strong beads and a completely functional shoulder design. The company states that through uniform tension drying, in which every body cord is processed to remove the excess stretch, practically all of the potential tire growth and the resulting tread cracking, due to growth, has been eliminated. A new oval body contour is said to represent an entirely new principle in tire construction. The oval shape relaxes the tread after inflation, making it flatter, relieves tread stress and strain and gives increased resistance to cuts, snags and wear, Firestone says. Called the Firestone Transport Truck Tire, the new casing's tread is designed with five husky circumferential ribs, precisely constructed to use the tread rubber most efficiently on both tractor and trailer wheels. The heavier ribs hold their shape, resist cupping and wiping, make steering easier and provide increased safety under all conditions. Through the development of an entirely new tread compound featuring a combination of improved curing ingredients and special high-abrasion-resistant carbons, the tire is said to have the toughest, longest-wearing highway tread stock known.

Acquires American Latex Products

Dayton Rubber Co., Dayton, Ohio, has announced that subject to satisfactory completion of audits now in progress, the company would exercise its option to acquire all of the outstanding stock of the American Latex Products Corp. of Los Angeles, Calif. Details of the acquisition basis will be announced upon final completion of the transaction. American Latex is privately owned while Dayton Rubber is listed on the New York Stock Exchange. American Latex, during the fiscal year ended June 30, 1952, approximated $3,000,000 in sales. Dayton Rubber, in the fiscal year ended October 31, 1951, had net sales of $54,602,954. Formed in 1946, American Latex is a large supplier of foam rubber products for the West Coast aircraft industry. It also makes mattresses, cushions and other foam items for the furniture industry. It produces a sponge rubber product of its own development under the trade name "Moltex", is among the largest U. S. manufacturers of office seat cushions, and is a major factor in the West Coast adhesive market, producing "Stabond" adhesives. Founded and headed by C. M. Christie as president and general manager, the firm will continue under its present officers as a separate corporate division of Dayton Rubber. No executive personnel changes are planned.

Wyandotte Chemicals Corp. has established a pre-doctoral study fellowship in organic chemistry at Wayne University. The fellowship, to be awarded annually, carries an award of $1,200 plus tuition and fees.

EAGLE-PICHER PAYS $7,981,350 FOR OHIO RUBBER COMMON STOCK

On July 14, the Eagle-Picher Co. of Cincinnati, Ohio, purchased 245,580 shares or 98.2% of the common stock of the Ohio Rubber Co. for $7,981,350. The company had previously offered to purchase all of the common stock of Ohio Rubber for $8,125,000. The shares were deposited in acceptance of the Eagle-Picher offer to purchase all of the 250,000 outstanding shares at $32.50 per share which expired at noon on July 14. Ohio Rubber also has $1,837,500 of funded debt and $1,915,900 of preferred stock which remain outstanding.

Ohio Rubber has experienced a substantial growth in recent years, sales having risen from $7,513,000 in 1940 to $32,740,000 in 1951. In the current year, sales might approximate those of 1951, despite the loss of volume resulting from an earlier strike in its own plants and the effect of the present steel strike upon its customers.

According to Eagle-Picher, Ohio Rubber will continue to operate under its present management headed by Franklin G. Smith, chairman of the board, and H. F. Safford, president.

Dinsmore Speaks at M.I.T.

Dr. R. P. Dinsmore, vice-president in charge of research and development for the Goodyear Tire & Rubber Co., recently addressed the summer sessions of the Massachusetts Institute of Technology, taking part in a clinic on elastic high polymers in science and industry. The clinic was conducted by Dr. Ernst A. Hauser, professor of chemical engineering at M.I.T. Dr. Dinsmore noted that the American rubber industry is called upon to produce more than 1,000 different sizes and types of tires involved directly or indirectly in our national economy. His lectures, covering a two-day period, dealt with factors involved in tire construction —steering control, cushioning ability, durability and safety. He said that there are reasonably well-defined ranges of performance required on different types of tires, and each size and type has been designed and constructed to meet some specific need in transportation and industry. In almost every field of activity, he said, from highway transportation to the lawnmover, tires are involved directly and indirectly in our civilian life. Military use, too, he pointed out, has included the smallest industrial tire to giant tires used on tank retrievers.

Hewitt-Robins Gets Loan

Hewitt-Robins Inc. has borrowed $4,300,000 from the Northwestern Mutual Life Insurance Co. Arranged by F. Eberstadt & Co., Inc., the 4½% borrowing will come due July 1, 1972. Approximately $3,000,000 of the proceeds will go to retire bank indebtedness, while the rest will go into working capital. At the same time, Hewitt-Robins gave Northwestern Mutual a warrant to buy 50,000 shares of common stock, $5 par. The stock will cost the insurance company $26.26 a share if bought before July 15, 1957, and $28.65 if bought between that date and July 15, 1964.

FIRESTONE SYNTHETIC ELIMINATES COSTLY REFRIGERATION EQUIPMENT

Development of a new synthetic rubber that eliminates the need for the costly refrigeration equipment now used to produce "cold" rubber for tire treads has been announced by the Firestone Tire & Rubber Co. The new rubber is said to possess all of the long-wearing attributes of cold rubber and can be produced with the same equipment standardized in all synthetic rubber plants during World War II.

The company points out that future synthetic rubber plants can now be built at a lower cost than present plants which have to install refrigeration equipment to improve the quality of the synthetic rubber. The new rubber, produced at the standard 122° F. polymerizing temperatures, provides exceptionally long mileage service in tire treads.

Early in the synthetic rubber development program, a large number of catalysts, or initiators, for the polymerization process were examined by government and industry chemists. A recent review of some of these materials by Firestone research scientists led to the discovery that the material known as Nitrazole CF would produce a superior synthetic rubber by the conventional "hot" rubber process.

Intensive development work has resulted in the perfection of the Nitrazole recipe now being used to make the new and improved synthetic rubber. The key material in the new process is Nitrazole CF, chemically known as para-nitrobenzene diazonium para-chlorobenzene sulfonate.

After successful development and large-scale production of this new synthetic rubber in Firestone-operated synthetic rubber plants, extensive tire tests of more than 2,000,000 tire miles were conducted by government and Firestone tests fleets. Results of these tests have shown conclusively that Nitrazole rubber is equal to cold rubber in all respects, and it can be produced without costly refrigerating equipment, the company states.

UNITED STATES PRODUCTION AND SALES OF RUBBER-PROCESSING CHEMICALS

Synthetic Organic Chemicals—1951

	Production (1,000 pounds)	Sales: Quantity (1,000 pounds)	Sales: Value (1,000 dollars)	Sales: Unit value (Per pound)
Grand total	137,970	106,370	57,533	$0.54
Rubber-Processing Chemicals, Cyclic				
Total	115,520	87,301	43,785	.50
Accelerators, total	55,981	34,643	16,685	.47
Butryaldehyde-aniline	1,025	871	469	.54
Guanidines	6,373	5,619	2,681	.48
Thiazole derivatives, total	47,183	27,168	12,092	.43
2,2'-Dithiobis [benzothiazole] (2,2'-Benzothiazyl disulfide)	17,118	12,748	5,186	.41
2-Mercaptobenzothiazole	18,160	3,233	1,158	.36
All other	11,905	11,187	5,748	.51
All other	1,400	985	1,443	1.46
Antioxidants, total	56,996	50,147	24,717	.49
Amino or hydroxy compounds	27,192	25,773	13,359	.52
All other	29,804	24,374	11,358	.47
Peptizers, tackifiers, and inhibitors	2,543	2,511	2,383	.95
Rubber-Processing Chemicals, Acyclic				
Total	22,450	19,069	13,748	.72
Accelerators, total	11,595	8,346	7,011	.84
Diethyldithiocarbamate, zinc salt [1]	1,354	606	605	1.00
Tetramethylthiuram sulfides, total [2]	5,391	3,609	3,705	1.03
Tetramethylthiuram disulfide	4,577	2,846	2,870	1.00
Tetramethylthiuram mono- and tetrasulfide	814	763	835	1.09
All other	4,850	4,131	2,701	.65
Peptizers, total	10,855	10,723	6,737	.63
Dodecyl mercaptans	9,456	9,657	6,280	.65
All other	1,399	1,066	457	.43

[1] Data for dithiocarbamates included in this table are used entirely in the processing of natural and synthetic rubbers. [2] Includes data for small amounts of tetramethylthiuram sulfides reported produced for uses other than the processing of natural and synthetic rubbers.

Hewitt Acid-Resistant Hose

A new rubber hose recently developed by the Hewitt Rubber Division of Hewitt-Robins Inc., is said to give promise of resisting concentrated organic and inorganic acids. Company officials pointed out that in the past, previous recommendations on the use of hose in conveying acids were limited to these maximum concentrations: sulfuric, 50%; nitric, 10%; hydrochloric, 80%; and hydrofluoric, 50%. The company explained that with its new hose compound, the percentage of concentration can be raised to 100% for all but nitric and sulfuric acids. However, nitric can be raised to 75% and sulfuric to 98%. The new hose compound will also withstand the action of fuming nitric acid over 86% if used for intermittent service. The resistance of this hose to all acids and alkalies is being evaluated, the company said. The compound is also suitable for chlorine and saturated chlorine water service. Prior to this development, it was said, satisfactory compounds for this service were not available.

Sherry Named Production Manager

Frank Sherry, formerly production manager of the Processing Division of the B. F. Goodrich Rubber Co. of Canada, Ltd., has been named production manager of the parent company's Plastic Products Division plant at Marietta, Ohio. Mr. Sherry has been associated with Goodrich for the past 11 years. He was graduated from Rensselaer Polytechnic Institute. Mr. Sherry began his association with Goodrich in the chemical laboratory. Later, he was named floor foreman and then general foreman. He was general foreman of the Processing Division in Akron before he was named to the Canadian post.

American Resinous Chemicals Corp., Peabody, Mass., has made available a new technical report covering ARCCO heat seal emulsions for heat bonding various combinations of papers, cloths, leathers, metal foils, plastic films, and other surfaces. Ask for Data Sheet A-43

General Tire Buys Crosley Motors

General Tire & Rubber Co. has purchased Crosley Motors of Cincinnati, Ohio, for an exchange of stock which would give a value of about 20c a share to the Crosley shares. William O'Neil, president of General Tire, said an arrangement had been made with members of the Crosley family and associates by which his company will acquire 317,077 shares of $5 par common stock of Crosley Motors in exchange for 756 shares of 3½% second preferred stock of the Akron company. There are 569,254 of Crosley common stock outstanding. Its balance sheet as of July 31, 1951, showed assets of $5,728,280. The deal is subject to audit. Crosley Motors was formed in 1945 with automotive assets separate from the Crosley Corp. The latter concern then was sold to the Avco Manufacturing Corp. Crosley Motors has produced about 8,000 cars in the last seven years. The company has prime and subcontracts for motors and other defense items. It has one plant in Cincinnati and another in Marion, Ind.

RECORD ATTENDANCE FEATURES RHODE ISLAND SUMMER OUTING

The Annual Outing of the Rhode Island Rubber Club held at the Metacomet Golf Club, East Providence, R. I., on June 26, attracted 184 members, an all-time record for the group. The outing was held on the hottest June day in the history of the local weather bureau. Under these conditions, many of the golfers found the putting green less taxing than the 18-hole championship course. The Outing Committee consisted of F. W. Burger (Kleistone Rubber), Fred Newman (Respro), Kenneth Priestley (U. S. Rubber), Gilbert Enser (Collyer Insulated Wire), Harry Ebert (Firestone), Ray Szulik (Acushnet Process), Leigh Kingsford (U. S. Rubber), Urbain Malo (Crescent), and Roy Volkman (U. S. Rubber). Golf prizes were awarded as follows:

First Low Gross, Fred V. Newman; *Second Low Gross*, Dave Scott (Scott Testers' Inc.); *Third Low Gross*, Arthur Perry (DuPont); *First Low Net*, Lyle Longworth (Monsanto); *Second Low Net*, F. W. Burger; *Third Low Net*, Fraser Malcolm (Titanium Pigment); *Blind Bogey (Kickers)*, Charles Haynes (Binney & Smith), Mal Langford (Dow Corning) and Stanley Szulik.

Nearest to Pin—5th Hole, William Maguire (United Carbon); *Nearest to Pin—7th Hole*, John Marshall (Collyer Insulated Wire); *Nearest to Pin—10th Hole*, Al Kroepel (C. K. Williams); *Most 6's*, William Kugler (Taylor Instrument); *Most 7's*, G. F. Jacobson (U. S. Rubber); *Most 8's*, John MacKay (Phillips Petroleum).

High Gross, Joseph Powell (D. H. Litter); *High Net*, Webster Day (DuPont); *Longest Drive*, Marvin Wilner (Plymouth Rubber); *Guest Low Gross*, William Clarke (Arnold Hoffman), Thomas Joy (Gulf Oil), and W. A. Forbush (Avon Sole).

Akron Plans Symposium on Vinyl

The Fall Meeting of the Akron Rubber Group scheduled for October 17 at the Mayflower Hotel in Akron, Ohio, will feature a symposium on "Vinyl Compounding and Processing" at an afternoon session. In planning this meeting, the group has been joined by the Cleveland Section of the Society of Plastics Engineers. A panel of experts, all closely associated with the plastics industry, is being assembled to answer questions pertaining to all phases of the manufacture of plastics products. The symposium will start at 2:00 P. M. and will be followed by a social hour and dinner at 7:00 P. M. The evening program will feature an address by William O'Neil, president and chairman of the board of the General Tire & Rubber Co.

Swedish Firm Seeking Imports

Ulvsunda Gummifabriks Aktiebolag, Postgiro 10899, Bromma, Sweden, is interested in importing various types of rubber products, particularly in the household, stationery and sporting goods fields. Interested American firms may contact the company for full particulars.

WASHINGTON APPOINTMENTS

Dr. George E. Holbrook, assistant director of the Development Department of E. I. du Pont de Nemours & Co., Inc., who has been serving as assistant director of the Chemical Division of NPA since March 31, 1952, has been named director of the division succeeding Osgood V. Tracy, who has returned to his former position as general manager of the Chemical Products Department of the Esso Standard Oil Co.

H. Gordon Fromm, assistant to the vice-president of manufacturing of the Johnson & Johnson Co., has been loaned to NPA where he will be assistant chief of the Program and Requirements Branch of the Chemical Division.

Aden R. Miller, until recently associated with the NPA Rubber Division, has joined the Office of Price Stabilization as chief of the mechanical goods section of the Rubber Branch. He will also supervise activities of both the general products and coated fabrics sections.

L. A. Schlueter, formerly chief of the Coal Tar Chemicals, Dyes, and Intermediates Branch of the Chemical Division of NPA, has been named assistant director of the Chemical Division.

Fred W. Fraley, previously deputy assistant administrator of the Chemical, Rubber and Forest Products Bureau of NPA, has been appointed assistant administrator in charge of the bureau.

N. Y. Holds Golf Tournament

A record attendance of approximately 200 members and guests, with over 180 participating in the tournament, was marked at the Annual Golf Tournament of the New York Rubber Group, held at the Baltusrol Golf Club, in Springfield, N. J., on August 5. The first leg on the Nesbit Golf Cup, a beautiful Paul Revere bowl, donated by J. H. Nesbit, president of the U. S. Rubber Reclaiming Co., was won by Vincent J. Lake (Pioneer Latex), who turned in a low gross of 79, seven above par for the course. The presentation was made by Mr. Nesbit. The first three-time winner will retain permanent possession of the cup. Other low gross winners included A. H. Eufer (81), E. B. Curtis (83), J. Breckley (87), and E. M. Tolin (87). Low gross honors for the guests went to J. C. Vincent, who shot an 80. High gross honors, with a score of 152, went to R. J. McKeefery and C. T. Jansen. Top honors in the putting contest were won by F. Lake and J. Gilbert. Special prizes were awarded to all who scored birdies, as well as to a number of winners in the kicker's handicap. Several door prizes were also awarded. The committee in charge of activities included J. Breckley (Titanium Pigment) as chairman, and W. S. Rea (United Carbon) as treasurer. Other members of the committee included E. J. Geise (Huber), G. H. Provost (U. S. Rubber), and H. E. Selby (H. V. Hardman).

BUFFALO RUBBER GROUP HOLDS GALA ANNUAL SUMMER OUTING

The Annual Summer outing of the Buffalo Rubber Group was held this year on July 22 at the Transit Valley Country Club, East Amherst, N. Y., with approximately 70 members and guests in attendance. The activities included golf, softball, horseshoes, an egg throwing contest and a baseball accuracy throw. A chicken dinner followed the athletic events. A number of door prizes were distributed as another feature of the meeting. Charles Johnson (Hewitt-Robins) served as general chairman for the outing. Winners in the different golfing events included:

Low Gross, Merrill Hickey; *High Gross*, Fred Kohlhagen (Hewitt-Robins). Other golf prizes were won by Paul Sick, C. M. Lavin, P. P. Gaffenhagen, F. H. Smart, W. T. Rossiter, Mr. Hickey, W. V. Sauter, Sid Freeman, H. C. Meyer, R. H. Sharp, A. T. Schoor, L. Mohr, Ed Martin, W. V. Butler, R. C. Emmett, F. Blanchard, Bob Babbit and R. C. Bolts.

U. S. Expands DuPont Suit

The Federal District Court sitting in Chicago, Ill. has granted permission to the federal government to amend its antitrust suit against the DuPont industrial organization, so as to add 115 individuals and one corporate defendant to the original three individual and five corporate defendants. Included among the individuals are 59 minors, while the entire list is made up of relatives, either by blood or marriage, of Lammot du Pont, who recently died, and his brothers, Irenee and Pierre. The three brothers were the original individual defendants. The additional corporate defendant named is the Wilmington Trust Co. of Wilmington, Del., in which the majority of voting stock is held directly or indirectly by the individual defendants.

Fort Wayne Holds Summer Outing

The first Summer Outing of the Fort Wayne Rubber and Plastics Group was held on June 13th at the Tippecanoe Country Club near Warsaw, Ind. Approximately 150 members and guests enjoyed golf and swimming during the day and a dinner in the evening. Jack Stiff (Binney & Smith) headed the Outing Committee. Low gross honors for the day went to Paul Lantz (Syracuse Rubber), while Paul Giordon (U. S. Rubber) won a prize for high gross. The first kicker's prize went to Harry Brubaker (Witco). A number of handsome items were distributed as door prizes at the outing.

Chicago Holds Golf Outing

The Chicago Rubber Group held its Annual Golf Outing this year at the St. Andrews Golf Club, West Chicago, Ill., with approximately 300 members and their guests in attendance. Low gross honors went to James Adams of Sears, Roebuck & Co. with a 76. Many other prizes were also distributed. After the golfing, a dinner consisting of lobster and roast beef was served.

INSURANCE GROUP CITES CAUSES OF RUBBER INDUSTRY ACCIDENTS

According to a study by safety engineers of the Kemper Insurance Group, strains and other injuries caused by improper handling of objects and materials take the biggest annual injury toll among workmen in the rubber industry. The study shows that 39% of the industry's accidents are direct results of mishandling, while many other accidents are indirect results. The study also shows that 14% of the mishaps involve machinery, 14% from being struck by falling objects and other objects, 8% from stepping on or bumping into objects, 11% from skin irritations, 7% from falls, and all other accidents, 7%.

The study was based on an analysis of more than 1,000 typical accidents in the rubber goods industry—each accident serious enough to fall under workmen's compensation. A breakdown in each category of accidents showed that under mishandling of objects and materials, which accounted for 39% of the accidents, came strains and crushing injuries, 23%; injuries by knives, 5%; injuries by hand tools other than knives, 5%; burns, 4%; and splinters, 2%.

The accidents involving machinery, 14% of the total, included accidents at point of operation of molds, 8%; accidents at point of operation of all other machines, 4%; and accidents at point of transmission of all machines, 2%. Accidents as a result of being struck by objects, accounting for 14% of the total, included accidents resulting from falling or dropped objects, 9%; and foreign matter in eyes, 5%.

Accidents caused by stepping on or bumping into objects, 8% of the total, broke down to include bumping into objects, 6%; and stepping on objects, 2%. Under falls, 7%, came falls on level surfaces, 6%; and falls from elevations, 1%. Miscellaneous accidents, accounting for 18%, included skin irritations, 11%; and all other, 7%.

The study pointed out that the basic causes of accidents can be overcome only through a deliberate program of accident prevention under the leadership of management. It was pointed out that the cost of industrial accidents has increased substantially over the past 10 years and that this cost adds needlessly to the expense of doing business. Mechanical conditions can be changed readily, the report asserted, but the difficult part of the safety program is to teach workers the proper attitude toward safety so they will practice it of their own accord.

Quaker Rubber Opening New Plant

Quaker Rubber Corp. of Philadelphia, Penna., a division of the H. K. Porter Co., Inc., is opening a Pacific Northwest regional factory, warehouse and offices in Portland, Ore. The Portland office will serve Oregon, Washington, Idaho, Utah, Nevada and half of Montana. Milton L. Clark has been assigned as regional manager of the new office. Quaker Rubber manufacturers transmission and V-belts, hoses of all types, molded rubber products, etc.

Coming Events in the Rubber Industry

Sept. 4. No. California Rubber Group, Elks Club, Berkeley, Calif.

Sept. 8-11. A.S.M.E., Fall Meeting, Chicago, Ill.

Sept. 11. So. Ohio Rubber Group, Engineers Club, Dayton, Ohio.

Sept. 13. Connecticut Rubber Group, Outing.

Sept. 14-19. A.C.S., Annual Meeting, Atlantic City, N. J.

Sept. 17. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Sept. 25. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne, Ind.

Oct. 3. Detroit Rubber and Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 7. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Oct. 9. No. California Rubber Group, Elks Club, Berkeley, Calif.

Oct. 17. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Oct. 17. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Oct. 20-24. 40th National Safety Congress and Exposition, Chicago, Ill.

Oct. 24. New York Rubber Group, Henry Hudson Hotel, New York, N. Y.

Oct. 29-31. Rubber Division, A.C.S., Fall Meeting, Hotel Statler, Buffalo, N. Y.

Nov. 6. No. California Rubber Group, Elks Club, Berkeley, Calif.

Nov. 11. Los Angeles Rubber Group, Hotel Mayfair, Los Angeles, Calif.

Nov. 14. Connecticut Rubber Group, Fall Meeting.

Nov. 21. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Dec. 4. Ft. Wayne Rubber and Plastics Group, Hotel Van Orman, Ft. Wayne, Ind.

Dec. 12. Boston Rubber Group, Hotel Somerset, Boston, Mass.

Dec. 12. Detroit Rubber & Plastics Group, Xmas Party, Detroit-Leland Hotel, Detroit, Mich.

Dec. 12. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 13. So. Ohio Rubber Group, Miami Valley Golf Club, Dayton, Ohio.

Dec. 16. Buffalo Rubber Group, Xmas Party.

Dec. 19. Chicago Rubber Group, Xmas Party, Morrison Hotel, Chicago, Ill.

Mar. 18-20, 1953. Rubber Division, A.C.S., Hotel Statler, Los Angeles, Calif. (In conjunction with 122nd meeting of A.C.S.).

May 27-29, 1953. Rubber Division, A.C.S., Spring Meeting, Hotel Statler, Boston, Mass.

Sept. 9-11, 1953. Rubber Division, A.C.S., Fall Meeting, Hotel Sherman, Chicago, Ill.

DuPont Marks 150th Anniversary

E. I. du Pont de Nemours & Co., Inc., is celebrating its 150 anniversary this year. The occasion was observed by employees and members of the du Pont family in ceremonies at the site of the company's first mills on Brandywine Creek, Wilmington, Del. The program included an historical dramatic prologue depicting the company's founding. After the prologue, Henry B. du Pont, great-great-grandson of the founder, and a vice-president and member of the Executive Committee of the company, spoke, followed by Crawford H. Greenwalt, president, and Walter S. Carpenter, Jr., chairman of the board of directors. A marker, formed by one of the two huge millstones ordered from France by the founder of the company, was dedicated. Bronze plaques, designed and executed by a prominent sculptor, are mounted on the stone. The ceremony was closed with a benediction by Dr. William C. Munds, rector of Christ Church, Greenville, Del., which has been attended by the du Pont family and company employees for 100 years.

Tingley-Reliance Changes Name

At a special stockholder's meeting of the Tingley-Reliance Rubber Corp., held at the company's home offices in Rahway, N. J. on June 17th, the name of the company was changed to the Tingley Rubber Corp. At the same time, William H. Rand, formerly treasurer of the company, was elected president succeeding William McCollum, Sr., who was named chairman of the board. Tingley Rubber Corp., founded in 1896, makes rubber footwear and automotive accessories, as well as molded rubber products for the electrical, optical, appliance and other fields.

Increases Aromex Facilities

J. M. Huber Corp. has increased its production facilities for its improved oil furnace black, Aromex 115. This black is being produced at the company's new plant near Baytown, Texas. According to company officials, this new black provides 15% increased tread wear over standard high abrasion furnace blacks under average conditions.

RUBBER-STICHTING HOLDS SYMPOSIUM ON RUBBER RESEARCH PROGRESS

A three-day conference of 150 rubber technologists was held at the Rubber-Stichting in Delft, Holland from July 1 to 3. The purpose of the conference was to bring technologists engaged in the industry into contact with recent developments in the rapidly growing field of rubber research. Some thirteen European countries were represented at the conference. Dr. R. Houwink, director-general of Rubber-Stichting acted as chairman of the meeting. Dr. H. C. J. de Decker, director of the Research Department, and Dr. P. Braber conducted the lectures and the discussions which followed.

Among the papers delivered at the symposium was one by Dr. Kraay, who has been active in the latex field for many years. In his paper, Dr. Kraay dealt with the composition and reactivity of latex. In particular, he discussed the results of the work on the changes in the adsorption layer of the rubber particles during storage of latex. The influence of these changes on the mechanical stability and sensitivity of the latex with regard to cations (Zn-ions) was explained.

In another paper, Dr. van den Tempel, carrying out fundamental colloid-chemical research on latex, discussed the degree of dispersion of the rubber in latex. Recent work, using the electron-microscope, has brought to light several important facts, because the smallest particles in latex are not directly observable with the light microscope.

Although these tiny particles represent a very small percentage of the total amount of rubber in latex, he said, they contribute largely to the specific surface area and are, therefore, largely responsible for conditions of stability.

Hard Rubber From Latex

Another speaker, Dr. de Vries, discussed the technical possibilities of hard rubber made directly from latex. The various methods of processing, which are available for the manufacture of latex-ebonite were reviewed and a clear picture of the mechanical properties of this new material was given. This was accomplished by comparing these properties with those of Bakelite and of ebonite.

Professor van Rossem, director of the Rubber Research Institute, T.N.O., and scientific adviser to Rubber-Stichting, chose as the subject for his talk the behavior of rubber at low temperatures. Starting from a consideration of the physical changes occuring when reducing temperature, such as a possible crystallization and the freezing of elastomer chains, the properties of natural and synthetic rubber were discussed. Various methods which exist in assessing the behavior of rubbers at low temperatures were discussed as were the results which have been attained by these methods.

The scientific adviser to the Research Department of Rubber-Stichting, Dr. Salomon, delivered a paper on chromatography. The speaker stated that this universal analytical procedure may, in possible combination with other methods of analysis, render a valuable service to the rubber technologist when investigating complex structures of organic materials. It may be expected, he declared, that chromatography will in particular make valuable contributions to the analysis of antioxidants, vulcanization accelerators and the non-rubber constituents in latex serum.

Rubber in Building Industry

On the second day of the symposium, Dr. Braber, head of the Technical Development Department of Rubber-Stichting, enumerated a number of novel applications of rubber in the building industry, many of which have been used in Rubber-Stichting's new building. Many of these applications, he noted, are still of an experimental nature. One of the most interesting features of this new building is that it provided the means to experiment on a practical scale with a number of new latex and rubber applications.

In a subsequent lecture, Dr. Braber dealt with some recent developments in the testing of rubber. These developments are aimed at the establishment of better correlation between the results of laboratory tests and behavior under actual conditions of use. A better understanding of the fundamental properties of rubber is necessary so that testing procedures can keep abreast of the rapidly-developing processing technology, he said. With these considerations in mind, the speaker discussed the mechanical conditioning of testpieces, accelerated aging and the dynamic testing of rubber.

Dr. Houwink treated the subject of reinforcement and stated that a good adhesion between rubber and filler is an essential requirement for the reinforcing effect. This adhesion, he explained, is mainly due to van der Waals' forces, whereas chemical forces play only a minor part. It was explained that the topography of the filler surface is of great importance.

The various reinforcing mechanisms encountered in practice, such as polar and non-polar crystallization, adsorption, cross-linking, etc., as well as combinations of these factors were discussed. Dr. Houwink outlined the further improvements in the mechanical properties of rubber which may be expected in the future.

Rubber-Resin Compounds

Dr. de Decker delivered a paper on rubber-resin compounds and explained the possibilities which are presented by the admixture of resins to natural rubber, firstly from the molecular theoretical point of view, secondly from the point of view of practical possibilities, and lastly from the point of view of the present need for materials. Several possibilities proved to be practically feasible, he said, such as in the case of soling materials in the United States.

Dr. Schonlau, senior technologist with the Technical Development Department, gave a survey on the development of fillers and chemicals in rubber technology during the past 10 years. In addition to the continuous development of existing products, organic fillers (e.g. styrene-resin) and organic sulfur compounds as vulcanizing agents have taken their place as really new products in compounding.

The processing characteristics of these products and the properties they impart in the vulcanized compounds were discussed. The development of the white reinforcement fillers, he said, has at the present time not proceeded to the extent that the properties of rubber containing these materials are equal to the corresponding black-loaded mixes.

In his second lecture, Dr. de Decker gave a survey on the abrasion of rubber. He summarized the results of the International Symposium on Abrasion and Wear (Delft, 1951) and pointed out that abrasion science up to the present has not developed beyond the phase of registering phenomena from practice and drafting general formulas and principles by trial and error.

In the field of automotive tires, the lecturer pointed to some typical differences in abrasive properties between various elastomers and between certain types of carbon blacks. The important part played by oxidation in the abrasion of tires was discussed. Finally, an outline was given of a program for systematic research directed toward a purposeful improvement of the abrasion resistance of automotive tires.

Permeability to Gases

Dr. van Amerongen, leader of the technological laboratory of the Research Department, commented on some points regarding the permeability of rubbers to gases. The permeability of natural rubber is greater than that of synthetics with polar groups, such as Perbunan and Thiokol, and greater than synthetic rubbers with an increased number of methyl side groups, such as Butyl. Some methods to improve the permeability of natural rubber were discussed by the speaker. One possibility presenting itself is the addition to natural rubber of polymers having low permeability, such as Thiokol or Vistanex.

A second method consists in compounding with lamellar fillers such as aluminum or mica powder. A disadvantage of the latter method is the decline in mechanical properties of vulcanizates containing such fillers. Tear resistance and permanent set, in particular, are adversely affected by these fillers.

Dr. van Alphen, leader of the Organic-Chemical Laboratory of the Research Department, dealt with the vulcanization of natural rubber in his paper. The speaker pointed out that the degree of vulcanization of latex films is best determined by swelling measurement and by the so-called T-50 test. Zinc oxide, he said, plays an important part in the vulcanization process, in that it promotes the solubilization of the accelerators in rubber.

Elimination of Oxygen

The elimination of oxygen during vulcanization did not yield any new concepts, he said. It was shown that vulcanized rubber dissolves in toluene at 100° C. in oxygen atmosphere, whereas in the exclusion of oxygen, the rubber does not dissolve under the same conditions. A definite

scientific picture of the vulcanization reaction cannot yet be given, he said, but experiments show that Barton's theory, as a partial explanation, has gained much in probability.

Dr. Kosten, professor in the Technical University at Delft and scientific adviser to Rubber-Stichting, spoke on vibration damping. After having dealt with the principles of the elimination of vexatious vibrations, it was stated that both for active and for passive vibration damping, soft rubber vulcanizates give best results. Only vibrations whose frequency exceeds twice the resonant frequency can be isolated, he said. Consequently, it proves very difficult to effect a satisfactory vibration damping with machines running at lower speed than 550 rpm.

The internal friction of the spring elements reduces the amplitudes of the resonant vibrations. In this respect, the speaker noted, rubber is better than steel, but the calculations of rubber spring elements are more complex than those of steel spring elements. For shear and compression loads of cylinders and other simple geometrical shapes, general rules and formulas may be given by engineers and other technicians not familiar with rubber physics.

After the symposium some 90 visitors took part in a field trip to the latex tank installations of the Rubber Cultuur Maatschappij Amsterdam (R.C.M.A.).

Dow Chemical Styrofoam 33

A new formulation of Styrofoam with greatly reduced burning characteristics has been developed by the Dow Chemical Co., Midland, Mich. The newly-formulated material meets American Society for Testing Materials test requirements for a "self-extinguishing" plastic, and it is therefore expected to find greatly increased use, particularly in the low-temperature insulation field. The new material is now in full production at the Midland plant and will be designated Styrofoam 33. Dow Chemical will continue to supply the white unmodified Styrofoam used in the floral and novelty fields as well as for buoyancy and many low-temperature insulation applications. This material will now be called Styrofoam 22. Styrofoam was originally developed as a buoyancy medium for life rafts and rescue equipment during World War II. The material was later improved to make it suitable for low-temperature insulation for cold storage plants, household refrigerators, home insulation, and industrial equipment and pipe covering.

United Engineering Names Gardner

United Engineering and Foundry Co., Pittsburgh, Penna., has announced the election of K. C. Gardner, Sr. as chairman of the board and chief executive officer of the company succeeding the late F. C. Biggert, Jr. Mr. Gardner has been associated with the company since 1899. Geoffrey G. Feard, formerly executive vice-president of the company, has been elected president and general manager, while K. C. Gardner, Jr. has been named executive vice-president. Maurice P. Sieger has been elected a vice-president and senior engineer of the concern.

Named Engineer Laboratories Head

Colonel Herbert Milwit has assumed command of the Engineer Research and Development Laboratories, Fort Belvoir, Va. A graduate of the United States Military Academy at West Point, he comes to the laboratories after a varied military career. One of his most important assignments was as Chief of the Intelligence Division of the Office of the Chief Engineer in the European Theater of Operations from June, 1942 to December, 1945. From this assignment, he went to the Office, Chief of Engineers, where he served both as Deputy and as Chief of the Engineer Intelligence Division until May 1947. During the past few years he has served with the Continental U. S. Defense Planning Group, and with the Photographic and Survey Section of the Joint Intelligence Group of the Joint Staff. From August, 1951 until June, 1952, he was a student at the Industrial College of the Armed Forces.

Named Executive Vice-President

Ben A. Gruver, formerly vice-president and sales manager of Los Angeles Standard Rubber, Inc., Los Angeles, Calif., has been elected executive vice-president and general manager of the company. At the same time, Harvey H. Morrison, previously production manager, was elected vice-president in charge of production. Ray G. McAdam has been named to the position of sales manager of the company.

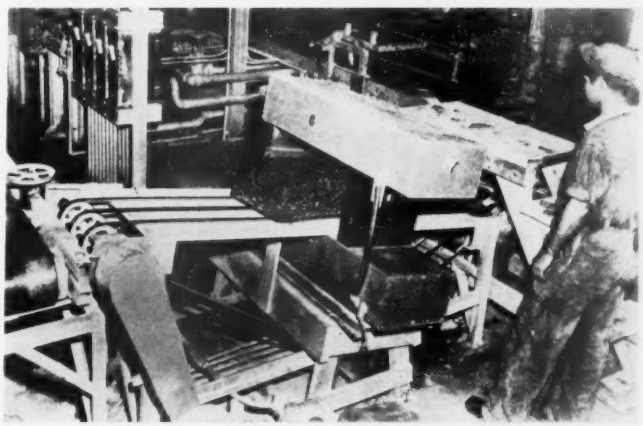
Madden Joins Caldwell Co.

Joseph P. Madden, formerly assistant sales manager of the Stauffer Chemical Co., has resigned to become a vice-president and a director of the Caldwell Chemical Co., with offices in New York, Detroit, Mich., and Portland, Ore. Mr. Madden joined Stauffer 19 years ago as a member of the Accounting Department and was transferred to the sales staff in 1933. Seven years later, he was named head of the Philadelphia sales territory, a post he held until 1942, when he was brought back to the New York office as assistant sales manager in charge of alkalies, chlorine and chlorinated products. He is a member of the Salesmen's Association of the American Chemical Industry, the Chemist's Club and the Armed Forces Chemical Association.

Goodyear Pliolite Latex 160

The Chemical Department of the Goodyear Tire & Rubber Co. has announced the production of an entirely new synthetic rubber latex in commercial quantities for use in latex emulsion paints. Marketed as Pliolite Latex 160, the new product is said to be superior to any other paint latex Goodyear has produced to date. The superiority is manifested in finished paints by better scrub resistance, higher film hardness, less odor, excellent film clarity, alkyd compatibility, better particle size and distribution, improved mechanical stability, and good brushing and application characteristics.

RCA METAL DETECTOR INSTALLED BY GOODYEAR SYNTHETIC AT HOUSTON



The picture above shows GR-S passing on the conveyor belt under the RCA Metal Detector which detects any tramp metal in the rubber.

Goodyear Synthetic Rubber Corp., agent of the Reconstruction Finance Corporation, recently installed an RCA Metal Detector in its Houston, Texas, GR-S plant. The unit is set up between the baling and the packaging operation in the finishing of synthetic rubber. The equipment is used to detect any tramp metal in the rubber before it is sent to the consumer. Approximately 170,000 pounds of GR-S are scanned by the metal detector each day. Of the total production, about 0.5% is rejected by the metal detector and returned to process after tramp metal is removed. The unit is manufactured by the Radio Corporation of America, and marketed in the United States and Canada by the Eriez Manufacturing Co., Erie, Penna.

MATERIALS POLICY COMMISSION REPORTS ON LONG-RANGE RUBBER OUTLOOK

On June 23, the President's Materials Policy Commission released its report on the long-range supply and demand outlook for many of the strategic materials consumed by the United States. Chapter 20 of Volume 2 of this comprehensive report is entitled "Rubber — Natural and Synthetic". The findings and forecasts on rubber contained in the report should prove of great interest to the industry. The full report appears below.

RUBBER—NATURAL AND SYNTHETIC

The consumption of rubber in the United States can be expected to continue to grow vigorously, possibly doubling over the next 25 years. An even greater rate of increase can be expected in the other free countries, so that the total free world demand for new rubber about 1975 may possibly be round 2½ times 1950 consumption.

The competition of synthetic rubber is expected to bring the long-run world price of natural rubber down to the real cost of producing synthetic rubber—that is, to perhaps 20 cents a pound in terms of 1950 dollars.

The physical basis for a very substantial increase in the production of natural rubber is provided both by the development of a new highly productive tree stock, and by the possibility of increasing acreage. However, at the price likely to be set by the competition of synthetic rubber, and with the uncertainties generated both by the security interests of rubber-consuming countries in stimulating their own synthetic production and by the possibility of unsettled political conditions in southeast Asia, natural rubber production is not likely, in the long run, to keep pace with the growth in total demand.

In the near future, total supplies of rubber are likely to be ample, but eventually there can be expected a growth of demand that will require construction of new capacity for synthetic rubber production as well as the expansion of natural rubber production.

It appears evident that fundamental market forces, if permitted to operate, would bring about a marked expansion in the production of both natural and synthetic rubber during the next 25 years. To the extent that natural rubber production fails to keep pace with growing world demands for new rubber, and that the price of natural rubber is significantly above the real costs of synthetic rubber, the production of synthetic rubber can appropriately be expanded to make up the difference. This would tend to hold the world rubber price close to the real cost of producing synthetic rubber.

The market forces can operate only indirectly on synthetic production, however, so long as synthetic rubber continues to be produced principally by the United States government, and this factor must also strongly influence natural rubber producers. Government production of synthetic rubber may operate in two ways to inhibit natural rubber countries from expanding production:

1) To the extent that it leads to an administratively determined and somewhat lower price for synthetic rubber, it would reduce profit potentials on natural rubber.

2) It confronts natural rubber producers with the possibility of administrative price actions possibly more severe than normal market conditions would provoke.

In much the same manner, private industry in this country would hesitate to build synthetic rubber plants that might have to meet such competition from government plants.

If then synthetic rubber production is to expand adequately and with sufficient rapidity, and without injury to the economies of the natural rubber producing countries, it should be allowed to take place through normal market forces. The synthetic rubber production expansion that would take place under such circumstances would be consistent with national security, provided the appropriate stockpiling policies are also followed. The Commission, therefore, concurs in the declared United States Government policy "that the security interests of the United States can and will best be served by the development within the United States of a free competitive synthetic-rubber industry" (Public Law 469-80th Congress; extended to June 30, 1952). To this end, it appears desirable that efforts be continued toward an early disposal of government plants and removal of government regulations.

United States Position

The total actual consumption of rubber in the United States in 1950, after adjusting for inventory changes, amounted to 1,620,000 long tons of new and reclaimed rubber, an all-time peak. Within that total consumption there were about 738,000 long tons of natural rubber, a level exceeded only in 1941; 582,000 long tons of synthetic rubber, making a total of 1,320,000 long tons of new rubber; and 300,000 long tons of reclaimed rubber. The properties of rubber, such as extreme elasticity, impermeability, softness, and electrical non-conductivity, have made it an essential material in a wide variety of uses. Transportation, chiefly pneumatic tires, absorbed about two-thirds of the total rubber consumed in 1950. In non-transportation uses, industrial rubber goods (such as mountings, belting, hose, and fittings), sponge and foam rubber cushioning, heels and soles, wire and cable insulation, and footwear, are the most important uses in roughly that order.

The tremendous growth in the consumption of rubber may be seen from the comparision with earlier years: in 1900, total rubber consumption amounted only to 20,000 long tons; by 1930 it had risen to 530,000 tons; by 1940 it was over 800,000 long tons, and by 1950 it had increased to over 1.6 million tons.

During 1950 the United States produced 476,000 long tons of synthetic rubber, less than half its present capacity, and 313,000 long tons of reclaimed rubber; it imported 803,000 long tons net, mostly natural rubber, a level exceeded only in 1940 and 1941. The total supply of both synthetic and natural rubber in 1950—1,592,000 long tons—was slightly less than actual consumption. The difference came from net inventory reductions.

Up to the second World War, the United States was dependent on outside sources, principally southeast Asia, for its entire new rubber supply. This was all natural rubber. Synthetic rubber production capacity was developed during the war but much of it was closed down afterward, to be reopened after the invasion of South Korea. Synthetic rubber production amounted to 36 percent of new rubber consumption in 1950, and 74 percent in 1951 when much of the imported natural rubber went into the stockpile.

The bulk of this synthetic capacity consists of a general-purpose rubber known as GR-S (Government Rubber-Styrene), a copolymer of butadiene and styrene. Butadiene, which is a gas at normal temperatures and pressure, may be produced from either petroleum or alcohol. Alcohol butadiene costs more because of the higher initial cost of alcohol as compared with petroleum. Styrene is made from benzene and ethylene.

The remaining synthetic capacity is for certain special-purpose rubbers such as Butyl from petroleum, neoprene from acetylene gas, and several so-called N-type rubbers which are copolymers of butadiene and acrylonitrile. All GR-S and Butyl production facilities are government-owned.

During the war domestic synthetic rubber production reached 820,000 tons in 1945, of which over 700,000 tons were GR-S. In 1950 the United States produced 476,000 tons, of which 358,200 tons were GR-S. Total capacities of government and private plants are expected to be about as follows by the middle of 1952:

	Long tons per year
GR-S	860,000
Butyl	90,000
Neoprene	70,000
N-type	20,000
Total	1,040,000

United States consumption of rubber, new and reclaimed, may reach 3.3 million long tons by 1975. (See "Projection of 1975 Materials Demand.") This doubling of demand would represent a lower rate of increase than occurred during the preceding 25 years, a period when consumption tripled. The lower rate of increase would result partly from the fact that the number of motor vehicles in operation is not expected to increase in the future as rapidly as in the past. In fact, an even larger part of increased demand in the decades ahead may be associated with non-transportation uses—a category that increased more than fivefold between 1925 and 1950 and may be expected to continue to grow rapidly.

The United States has two main sources of domestic supply to meet its requirement—reclaimed rubber and the war-born synthetic industry. The growing volume of all rubber in use, and the high possible rate of recovery, provide a very high potential for production of reclaimed rubber. The competitive advantages and supply conditions of natural and synthetic rubber, as to both qualities and prices, have in the

past kept reclaimed rubber production below its potential level. Relatively greater reclaimed rubber production may be expected in the future, and it is projected to supply about 800,000 long tons by 1975, compared with 313,000 in 1950.

Synthetic Rubber Production

Given a projected total demand of 3.3 million long tons by 1975, and reclaimed rubber production of 800,000, new rubber supplies would have to be some 2.5 million tons.

Present domestic synthetic capacity is over 1 million tons a year. This capacity can be expanded substantially by new plant construction to keep pace with growing demands. Putting aside, for the moment, consideration of national security and possible future price and supply conditions for natural rubber and synthetic rubber production in other free countries, the basic factors that will affect expansion of synthetic rubber production in this country are the availability of feedstocks (such as butadiene, styrene, and isobutylene) and the quality and performance of synthetic rubber compared with natural rubber.

The supply of feedstocks can be readily increased over the next 25 years with little, if any, rise in real costs. The basic feedstocks absorb only a small part—less than 1 percent—of the total supplies of petroleum and natural gas likely to be available. Thus, even if United States synthetic rubber production were to reach 2.5 million tons by 1975, a level equal to total domestic needs, the amount of hydrocarbon feedstocks needed would be only about 10 to 15 percent of total petrochemicals, which in turn probably would constitute less than 5 percent of total petroleum and natural gas supplies. Of course, additional elaborate and expensive equipment would be required to obtain these feedstocks.

With regard to quality and performance, synthetic rubber is now equal or superior to natural rubber in a large proportion of uses, and its relative performance doubtless will continue to improve. New rubber polymers and, perhaps, new feedstocks may well be produced, while continued advances should be made in the qualities of the presently produced special and general-purpose synthetics. In 1975, therefore, natural rubber would have superior qualities, and be preferred, in a comparatively small portion of all uses.

In all likelihood, therefore, insofar as availability of feedstocks and performance qualities are concerned, synthetic rubber production can expand. Any judgment as to the likely rate and volume of expansion must, however, take into account the possible future developments in prices in the total world demand for rubber and in the supply of natural rubber.

The 1950 consumption of rubber in other free countries amounted to some 950,000 long tons, of which about 785,000 were natural rubber, 125,000 reclaimed and 40,000 synthetic. On the supply side, natural rubber production was about 1,855,000 long tons; synthetic 58,000; and reclaimed about equal to its consumption, 125,000 tons. The excess production of 1.1 million tons, mostly natural rubber, covered net shipments to the United States and countries outside of the free world. Three-quarters of the world's natural rubber output was from Malaya and Indonesia; southeast Asia as a whole accounted for 95 percent.

In view of the lower levels of rubber consumption in the other free countries, demands in those countries are projected as tripling over the next 25 years while that of the United States may double. Allowing for a roughly corresponding increase in production of reclaimed rubber, the demand for new rubber in the rest of the free world is taken as reaching about 2.5 million long tons by 1975, compared with 825,000 in 1950.

In terms of physical potential alone, natural rubber production could be expanded substantially during the next 25 years. Given stable political conditions in the natural rubber producing countries, particularly in southeast Asia, and a continuing favorable market, it is quite possible that the 1950 rate of production, 1,855,000 long tons, could be doubled by 1975. This could be achieved by a feasible rate of replanting with selected stock, which could triple rubber yield per acre. At the present time, yields per acre average 400 to 500 pounds. Improved stocks, which have been developed and used, have yielded as much as 2,000 pounds. Replanting could be supplemented by a sizable expansion in acres planted to rubber.

Even with future stable political conditions in the natural rubber producing countries, however, conditions in the industry together with the competitive forces of synthetic rubber and other agricultural products, suggest the greater likelihood that the expansion of natural rubber production may be at a rate which would bring it to a maximum of 2.5 million tons, at best, by 1975, an increase roughly one-third over 1950 production.

The average age of the rubber trees throughout Asia is about 30 years, well past the peak yield. During the past few years the unusually high rubber prices stimulated production, a large part of which involved slaughter tapping. But with the anticipated significant decline in natural rubber prices, it will no longer pay to tap many trees now being tapped, and the slaughter tapping to date will mean an accelerated decline in future yields and productive capacity. The rate of replanting and new acreage development would have to be substantial in order to offset this declining productivity. Replanting may be curtailed as competition with synthetic rubber drives down natural rubber prices and makes it difficult for the rubber growers to compete with other agricultural producers for resources, particularly labor, in the producing countries.

Further, while it is useful to attempt an evaluation of the possible future expansion of natural rubber production on the assumption of stable political conditions in the producing countries, account must be taken of the unstable conditions that exist today. Necessary replanting is not going forward currently. Since it takes about 7 years for new trees to reach a commercial yield, it seems possible that natural rubber production could be no more than sustained during the next 10 years or so and may even decline. Any future expansion may therefore start from a lower level and would have to be correspondingly greater. The likelihood that such an expansion would bring total output about 2.5 million tons appears questionable, although it is undoubtedly physically possible.

Prospects and Problems

It is evident that, with the more than adequate supply of synthetic feedstocks and improvement in synthetic performance qualities that may be expected, the growing demand for new rubber could readily be met by expanding synthetic rubber production. It is, on the other hand, questionable whether the expansion in natural rubber production, subject to the price competition of synthetic and possibly affected by political conditions in southeast Asia, will keep pace with growing demand.

While national security policies must affect the rate of expansion of domestic synthetic capacity, these policies can also be guided in part by market forces. At the end of 1951 the natural rubber price was about double that of synthetic rubber (around 50 cents a pound compared with 26 cents for GR-S rubber), and the supply of natural rubber was short of total free world demands for new rubber. Whenever the price of natural rubber is significantly higher than the cost of synthetic, including recoverable return on the investment, the incentive to expand synthetic rubber production will be strong. It is to be expected, therefore, that synthetic rubber supplies will continue to be increased over the long run, and will competitively bring down the price of natural rubber to the price level of synthetic rubber, which in turn should, in the long run, remain close to synthetic production costs. This situation would, of course, take hold after the next few years during which the world's new rubber supplies may be ample. Supplies currently available have induced a sharp decline in natural rubber prices.

If the synthetic rubber industry is in private

"Superba" Inflatable Cornice

An inflatable cornice made of Velon is now being manufactured by the Home Curtain Corp. of New York City. Named the "Superba," the cornice is inflated by mouth and has a luxurious tufted appearance. It may be installed by slipping it over a curtain rod, using the special hooks provided. The product will not chip or peel and can be kept clean by merely wiping with a damp cloth. Its surface is deeply embossed with a rich textured pattern. The cornice is reversible and conforms to any rod, straight or curved, and fits windows up to 42 inches wide. Superba cornices are available in a wide variety of patterns and colors.

hands, the governmental policy should follow the same general criterion of gearing synthetic production and the construction of new plants to the prospective demand for rubber at a price close to the cost of producing synthetic, subject, of course, to considerations of national security.

Cost of Production

Present experience affords some guidance as to the possible future cost of production of synthetic rubber. With operations at comparatively low levels of capacity, the costs of GR-S and Butyl rubber in government plants during 1949 were about 18½ cents a pound. Cost calculations indicate that if the plants had operated at full capacity, the costs per pound might have been as much as 3 cents lower. In spite of some new cost-saving production techniques, however, the government has had to increase its selling prices. In the case of GR-S, the use of higher cost alcohol feedstocks, required to expand production in the short run, necessitated a price increase from 18½ cents to 26 cents. And increasing costs of production led to a rise in the Butyl price, from 18½ cents to 20¼ cents a pound, in order to avoid a loss.

Since the supply of the petroleum-based feedstocks can be expected to increase substantially, the use of alcohol may be regarded as temporary. Further, the increased quantities of feedstocks should be available with little, if any, increase in real costs, so that insofar as feedstocks are concerned the real cost of about 20 cents may be taken as a long run cost guide, for both GR-S and Butyl rubber, on the basis of government-operated plants with present techniques.

The cost experience of private operators may, however, be significantly different, possibly higher. Feedstocks may be more expensive if purchased in the open market instead of being supplied within an integrated system. Similarly, investment, research, sales, tax, insurance, and interest charges may be appreciably different and higher for private operators. Finally, profit allowances would lead to higher prices. In all, taking into consideration the likelihood of marked technological advances which would tend to reduce costs, as well as improve the qualities of the synthetic rubbers, it appears that the long run cost per pound of GR-S and Butyl in private plants may be a few cents more than 20 cents a pound, based on the 1950 general price level.

The future real costs of producing the bulk synthetic rubbers, GR-S and Butyl, in this country may then conservatively be placed within striking distance of 20 to 25 cents in 1950 dollars, including a profit margin. And, allowing for special quality differentials, this would be the price range to which the natural rubber price would tend to adjust.

Share of Synthetic

It is not possible, nor is it necessary, to evaluate precisely the relative contributions of natural and synthetic rubber to the free world total of new rubber supplies in the future. It does appear likely that synthetic rubber supplies will continue to increase in relative importance and may account for as much as 50 to 60 percent of the total supply of new rubber around 1975.

Taken together free world demand for new rubber, as projected, would total some 5 million long tons by 1975. If natural rubber production does expand to what appears to be the most reasonable outside limit of 2.5 million long tons by 1975, and if the total amount is available to the free world, synthetic rubber supply would need to provide 2.5 million long tons by 1975 (50 percent of new rubber consumption), as compared with slightly over one-half million long tons in 1950 (25 percent) and less than 1 million tons in 1951.

In 1950, however, the Soviet Union and satellite countries absorbed about 11 percent of the world's total consumption of natural rubber. To the extent that their future rubber needs were met out of natural rubber supplies, synthetic rubber would have to meet a larger share of the free world's new rubber demand. If around 1975 the Soviet sphere countries should purchase no more than in 1950, about 200,000 long tons, the share of synthetic rubber in total free world supplies then would be around 55 percent. It is quite possible that the Soviet countries will buy an increasing amount of natural rubber, so that the share of synthetic rubber in free world consumption may be close to 60 percent.

It is not possible to estimate just how the expanding synthetic rubber capacity would be distributed as between the United States and other free countries. At present, Canada and Western Germany have a combined capacity of less than 100,000 long tons, and the remaining 90 percent is in the United States. Plans are being carried out or are being explored to introduce synthetic rubber plants in the United Kingdom, France, Italy, the Argentine, and Brazil. On the whole, it is most probable that national security and economic considerations will lead to an appreciable expansion of synthetic rubber capacity outside the United States. Synthetic production may also be expected to increase in Soviet countries.

The foregoing calculations as to the likely magnitudes and composition of consumption that may be expected by 1975, on the basis of the maximum production rate of 2.5 million long tons of natural rubber and the Soviet sphere countries taking no more than in 1950 (200,000 long tons), are summarized and compared with the 1950 data in the table which appears elsewhere on this page.

FREE WORLD RUBBER CONSUMPTION—1950 AND PROJECTED 1975
(thousands of long tons)

	United States		*Other Free Countries*		*Total Free World*	
	1950	1975	1950	1975	1950	1975
Natural Rubber	738	*a*	785	*a*	1,523	2,300
Synthetic Rubber	582	*a*	40	*a*	624	2,700
Total New Rubber	1,320	2,500	825	2,500	2,147	5,000
Reclaimed Rubber	300	800	125	400	421	1,200
Total consumption	1,620	3,300	950	2,900	2,568	6,200

Note: *a* Not separately projected.
Source: 1950 data, U. S. figure from 1951 *Statistical Abstract:* figures for rest of world from *Rubber Statistical Bulletin*, Vol. 6, No. 4, January, 1952.

Security Considerations

In view of the United States ability to expand synthetic rubber capacity, no serious security supply problem need be encountered during the next 25 years. If synthetic rubber capacity is expanded at a rate and volume close to the levels projected, a year or two should at any time enable the United States to build up any additional plant capacity needed for a war emergency. The national rubber stockpile, at goal level, would presumably provide supplementary supplies during the build-up period. The stockpile goal can, of course, be adjusted to changes in the relative dependence on imports, and to changes in the degree of substitutability as between natural and synthetic rubbers. Further, the stockpile goal would be affected by the extent to which natural rubber production is successfully fostered in Central and South America and in Africa.

Should natural rubber production fail to expand significantly, the United States and other free countries should increase synthetic rubber production at a correspondingly greater rate, and thus be closer to the plant capacity levels that might be required in a war emergency.

Jackson and Church Appointments

Appointment of James W. Hendry as director of plastics research and Boyd W. Bullock as manager of the Plastics Division has been announced by Jackson & Church, Saginaw, Mich. In his new capacity, Mr. Hendry will spend much of his time in foreign countries, conducting research and studying the development of automatic plastics molding machines, with emphasis on the molding of rubber, rigid polyvinyl chloride and thermosetting materials. New developments will be incorporated into the company's line of plastics equipment. In addition to his new responsibilities as manager of the division, Mr. Bullock is also assisant to President Clifford W. Stuart. Before joining the company, Mr. Bullock had been associated with the General Electric Co. and more recently was president of the Manufacturers' Marketing Co. of Chicago, Ill.

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NAMES IN THE NEWS

HAROLD G. ROBINSON, vice-president in charge of operations of Whittaker, Clark & Daniels, New York, N. Y., was recently married to MRS. DOROTHY MCKNIGHT. MR. ROBINSON has been associated with the New York company for the past 35 years.

JOHN G. REYNOLDS, associated with the Brown Co., Boston Mass., for the past 12 years, has been named advertising manager of the company and its Canadian subsidiary, the Brown Corp.

WILLIAM E. COWELL, associated with the Seiberling Rubber Co. since 1926, has been named manager of the Service Department succeeding O. K. FEIKERT, who recently resigned. K. P. PARKS, associated with the company since 1943, has been named assistant department manager.

D. F. BRADLEY, associated with the Shell Chemical Corp. since 1947, has been named manager of the Detroit district sales office succeeding W. E. KEEGAN, who has been named assistant to the vice-president in charge of marketing.

HERBERT H. JAYNES has been appointed New England manager of Jenkins Bros., succeeding ANTHONY D. WEBER, who recently retired after 44 years with the company.

F. L. BURNETT, treasurer and assistant secretary of the Pioneer Rubber Mills, San Francisco, Calif., has been elected to membership in the Controllers Institute.

K. W. GEORGE, associated with the Continental Carbon Co. since 1950, has been named controller for Continental and its affiliated carbon black companies.

REX C. SEANOR, chief engineer for the Adamson-United Co., has been named chairman of the Akron Section of the American Society of Mechanical Engineers.

DR. GILBERT E. GOHEEN, formerly associated with the Aniline & Film Corp., has been named director of research and development of the J. T. Baker Chemical Co.

FRANK E. PAYNE, previously president of the Crane Packing Co., Chicago, Ill., has been elected chairman of the company succeeding A. W. PAYNE, who recently retired. KARL V. ROHLEN, formerly vice-president and general manager, has been elected president of the company succeeding Frank Payne.

L. E. JUDD, director of public relations for the Goodyear Tire & Rubber Co., was recently presented with a service pin by the company marking his completion of 20 years' service.

DR. J. D. D'IANNI, associated with the Goodyear Tire and Rubber Co., has been named chairman for the 1952-53 term of the Akron Section of the American Chemical Society. DR. W. G. MAYES (Firestone) was named chairman-elect while DR. T. L. GRESHAM (Goodrich) and DR. J. T. GREGORY (Goodrich) were elected secretary and treasurer, respectively.

ROBERT C. WOODLEY, formerly manager of car dealer sales for the New York Division of the General Tire & Rubber Co., has been named regional director for the Eastern seaboard.

MARSHALL F. GILLESPIE, associated with the Goodyear Tire & Rubber Co. plant in Luxembourg and England for the past seven years, has returned to this country for a vacation after which he will return to Luxembourg.

L. K. MERRILL, formerly general superintendent of the Vinylite Plastic Division plant of the Bakelite Co. at Brooklyn, N. Y., since 1945, has been appointed vice-president in charge of product and process development for the company.

DONALD R. GUTHRIE, associated with the Minnesota Mining & Manufacturing Co. since 1939, has been named executive engineer in charge of engineering research for the company.

J. M. SELDEN, formerly sales manager of the Eastern Division of the Shell Chemical Corp., has been named manager of the division. He will continue to administer sales activities in addition to his other duties.

FRANK T. EATON, previously assistant market analyst of the Brown Co., has been named Solka-Floc sales representative of the Pulp Division of the company.

ALFRED H. LINCOLN, formerly associated with the Tillotson Rubber Co., has joined the Granet Corp., Framingham, Mass., as chief chemist.

J. L. REID, associated with the Goodyear Tire & Rubber Co. since 1920, has been appointed district manager of mechanical goods sales at Salt Lake City succeeding W. T. ROBERTS, who recently retired after 32 years' service with the firm.

W. S. RICHARDSON, vice-president of the B. F. Goodrich Co., has been elected vice-president of the Manufacturing Chemists Association.

ALLEN H. OTTMAN, vice-president and a director of the American Hard Rubber Co., has been elected vice-president of the New York City Control of the Controllers Institute.

Named Akron Sales Manager

R. K. Goodhue

Stauffer Chemical Co. has announced the appointment of R. K. Goodhue as their Akron District sales manager. Mr. Goodhue has been associated with Stauffer Chemical since 1942. He will make his home in Akron.

C. H. SCHLICTER, associated with the U. S. Rubber Co. since 1935, has been named manager of U. S. passenger tube sales for the Tires Division of the U. S. Rubber Co.

THOMAS C. YARNALL, associated with the B. F. Goodrich Co. for the past 24 years, has been appointed Central Division manager of the company's Replacement Tire Division. WILLIAM R. MEYER, formerly general supervisor of the Detroit district office, has been named manager of that office succeeding Mr. Yarnall.

ERNEST NATHAN has resigned as vice-president of the Sun Chemical Corp. and chairman of the chemicals group comprising the Warwick Wax subsidiary and the Warwick Chemical Division of Sun Chemical.

C. A. FRANKLIN, JR., associated with the New York Belting and Packing Co. for the past 17 years, has been appointed western district sales manager for the company succeeding O. L. WALL, who recently passed away.

W. A. FINN, previously general European manager of the Worthington Corp., has been named assistant general sales manager of the corporation.

WALTER S. SCHAMEL, associated with the American Wheelabrator & Equipment Corp. for the past six years, has been appointed district manager of the company's office in Los Angeles, Calif.

C. L. PETERSON, associated with the Minneapolis-Honeywell Regulator Co. since 1927, has been named general sales manager of the company's Industrial Division.

FINANCIAL NEWS

U. S. Rubber Co.

First Half: Net profit of $12,956,461, which is equal to $1.95 a share of common stock, compared with $16,427,189, or $2.62 in the first half of 1951 after providing for a preferred dividend. Sales for the first half of 1952 totaled $443,491,316, a new record and 3.7% above the $427,714,511 for the corresponding period of 1951. Current assets as of June 30, 1952, were reported as $351,512,604, against $337,962,691 as of June 30, 1951. Current liabilities at the end of the first six months of 1952 were $149,022,181, contrasted with $162,441,231 on June 30, 1951.

Brunswick-Balke-Collender Co.

First Half: Net loss of $440,000 after a $300,000 tax credit, contrasted with a net profit of $8,182, which is equal to 32c a preferred share in the first half of the preceding year. Net sales in the first half of 1952 were $9,224,871, against $9,984,204 in the first half of 1951.

Industrial Rayon Corp.

First Half: Net income of $4,350,600, which is equal to $2.48 per share of common stock, compared with $4,297,599, or $2.44 per share for the first half of 1951 after adjustment for additional federal taxes on income provided by the 1951 revenue act.

Seiberling Rubber Co.

First Half: Net profit of $437,137, which is equal to $1.08 per share of common stock, as compared with $675,427, or $1.86 a share in the first half of the previous year. Net sales in the first half of 1952 totaled $19,641,935, against $22,123,570 in the first half of 1951.

National Automotive Fibres, Inc.

First Six Months: Net profit of $986,386, which is equal to 99c a share on net sales of $38,614,804, compared with $2,747,963, or $2.76 a share, on sales of $50,189,258 in the first six months of the preceding year.

St. Joseph Lead Co.

First Half: Net income of $6,657,513, which is equal to $2.45 a share, against $7,729,138, or $2.84 a share in the first half of the previous year. The 1951 figure has been adjusted to give effect to the 10% stock dividend declared last June 10.

Denman Tire & Rubber Co.

For 1951: Net income of $154,632, which is equal to 70c a common share, compared with $128,039, or 59c a share in the preceding year.

Boston Woven Hose & Rubber Co.

Nine Months Ended May 31: Net income of $474,323, which is equal to $5.04 a common share, compared with $973,629, or $10.88 a share, in the nine months ended May 31, 1951. Sales in the nine months ended May 31, 1952 totaled $15,945,019, against $19,400,479 in the 1951 period.

American Zinc-Lead-Smelting

First Half: Net profit of $1,533,754, which is equal to $2.03 a share on net sales of $45,333,845, compared with $1,530,984, or $2.02 a share on sales of $40,088,663 in the first half of the preceding year.

Thermoid Company

First Half: Net income of $502,824, which is equal to 55c a common share on sales of $19,981,762, compared with $1,039,087, or $1.22 a share on sales of $21,026,325 in the first half of the previous year.

Sheller Manufacturing Corp.

First Half: Net profit of $1,211,838, which is equal to $1.10 a share on sales of $22,245,519, compared with $1,823,184, or $1.65 a share, on sales of $23,807,745 in the first six months of the previous year.

Allen Industries, Inc.

First Half: Net profit of $460,895, which is equal to 82c a share on net sales of $13,868,905, compared with $600,002, or $1.07 a share, on sales of $19,028,551 in the first half of the preceding year.

O'Sullivan Rubber Corp.

First Half: Net profit of $53,843, which is equal to 9c a common share on net sales of $2,953,000, compared with $147,057, or 33c a share on sales of $3,526,000 in the first half of the preceding year.

Okonite Co.

First Six Months: Net profit of $1,056,731, which is equal to $7.08 a share, compared with $745,117, or $4.99 a share, in the first six months of the previous year.

National Erie Corp.

For 1951: Net profit of $386,998, which is equal to $2.05 a common share, compared with 346,475, or $1.84 a share in the preceding year.

DeVilbiss Co.

First Half: Net profit of $429,691, which is equal to $1.43 a share, compared with $486,371, or $1.62 a share in the first half of 1951.

American Hard Rubber Co.

Twenty-four Weeks to June 15: Net profit of $177,176, which is equal to 45c a common share on net sales of $8,841,714, compared with $582,577, or $1.94 a share on sales of $11,539,835 for the corresponding period ended June 17, 1951.

Circle Wire & Cable Corp.

First Half: Net income of $1,068,363, which is equal to $1.42 a common share on sales of $10,801,787, compared with $1,182,059, or $1.57 a share on sales of $9,649,080 in the first half of 1951.

Cut Large Size Truck Tires 6½%

Goodyear Tire & Rubber Co. and the Lee Rubber and Tire Corp. recently announced immediate price cuts of about 6½% on all truck tires having a rating of 10-ply or higher. The reduction does not apply to truck inner tubes, according to a Goodyear spokesman, while Lee Rubber said that no changes in the prices of smaller truck or passenger car tires or tubes are contemplated. In June, Goodyear along with other producers, announced reductions ranging from 2½% on small truck tires to 7½% on the larger sizes of truck casings. At the same time, the company cut list prices of passenger car and truck tubes by 5% and farm tractor tubes by 7½%. While neither company offered any explanation for the reduction, industry sources point out that truck casings are "just not moving." This has resulted in a piling up of inventories at the manufacturers' level despite the working off of stocks in user's hands, accumulated after Korea. As a result, manufacturers' stocks are said to be at a record high, it was noted. The reduction in natural rubber prices is also said to be a factor. Similar price cuts were also announced by Goodrich, Firestone, and other manufacturers.

Named General Sales Manager

J. K. Buckwalter, direct sales manager of the Wooster Rubber Co., Wooster, Ohio, since 1948, has been named general sales manager of the company. In his new position, Mr. Buckwalter will be in charge of Rubbermaid houseware and Rubbermaid Kar-Rug sales in the United States and Canada. Since he joined Wooster Rubber, Mr. Buckwalter has been in charge of sales to specialty, chain, mail order and export companies. He joined the company after sales and industrial engineering experience with the U. S. Asbestos Division of Raybestos-Manhattan, Inc., at Manheim, Penna. Born at Penfield in eastern Pennsylvania, he graduated from Franklin and Marshall College at Lancaster, Penna. He served as a Naval aviator during World War II.

Heyden Chemical Corp. Moves

Heyden Chemical Corp. has announced the removal of its executive and sales offices from 393 Seventh Avenue, New York 1, N. Y., to 342 Madison Avenue, New York 17, N. Y. The new telephone number is MUrray Hill 2-7600.

B. F. Goodrich Promotes Scull

William W. Scull

William W. Scull, general manager of manufacturing services of the B. F. Goodrich Co. since 1947, has been named director of purchases and traffic to succeed Elmer A. Stevens, who becomes treasurer of the company on September 1. The new director of purchases and traffic joined Goodrich in 1929 following his graduation from Cornell University as a mechanical engineer. He served in the company's Purchasing and Sales Divisions until the rubber emergency occurred during World War II when he was named chairman of the Purchasing Committee composed of rubber company representatives. This committee was responsible for obtaining materials to build and equip the plants for the nation's synthetic rubber program. In 1944, he was named manager of the government-owned synthetic plant at Port Neches, Texas, built and operated by Goodrich. He was later transferred to Louisville, Ky., as manager of a similar plant there built and operated by the company. Mr. Scull became production manager of plants operated by the B. F. Goodrich Chemical Co. in 1945, and two years later was named general manager of the Manufacturing Services Division with headquarters in Akron.

New York Belting Joins Gilmer

New York Belting and Packing Co., Passaic, N. J., has joined forces with the L. H. Gilmer Co., a division of the U. S. Rubber Co. The new organization will continue to operate and be known as the New York Belting and Packing Co., maintaining a policy of selling to industrial consumers and dealers exclusively through established distributors. Gilmer products, including V-belts, flat belts, "timing" belts and shock pads, will retain the Gilmer name and will be sold by the new organization. New York Belting and Packing has been a major factor in the field of mechanical rubber goods sales for 107 years. With the acquisition of the Gilmer line, the firm will be able to offer its distributors one of the most complete lines of quality mechanical rubber goods in the industry. B. F. Kuether, vice-president of New York Belting, will be in charge of the expanded organization.

LABOR NOTES

National Rubber Machinery Co., Akron, Ohio, resumed operations on July 22 after it had been shut down for 110 days in a strike by the United Steelworkers, C.I.O. The union voted to return to work after accepting an 8c an hour wage rise and six paid holidays. The strike was not connected with the national steel strike.

Anderson Rubber Co., Akron, Ohio, fired 80 employees on August 1 for taking part in a wildcat strike. Company officials said the action was in accord with the company-union collective bargaining agreements. The company called twice on the wildcat strikers to return to work. Those who did not report were fired. The walkout began when the company discharged three men for refusing to carry out a foreman's orders.

Officers of URW Local 7 have been empowered with authority to call a strike at Firestone. The union's executive board will decide on a strike date if negotiations between the company and the union now in progress at Columbus, Ohio, break down.

A 10-man URW negotiating team has been granted the authority to strike seven Goodrich plants if union demands for higher wages and a new contract with improved working conditions, higher pensions and better welfare programs are not met.

Barrett Opens New Laboratory

A new laboratory, specially designed to develop and test materials used in the manufacture of rubber products, plastics, paints and varnishes, paper, laminates, insulating materials and a wide range of other products was recently opened by the Barrett Division of the Allied Chemical & Dye Corp. at Edgewater, N. J. Known as the Shadyside Applications Research Laboratory, the new unit contains extensive testing and actual production equipment including mills, presses, calenders, extruders, molding machines and other special purpose facilities. The laboratory will enable Barrett technicians to develop, test and evaluate, under simulated production conditions, Barrett materials used in industry.

Stiles Forms New Company

John W. Stiles, formerly president of the Island Equipment Corp., Long Island City, N. Y., has resigned his position with that company and announced the formation of a new firm, Stiles Conveyors & Transmissions with offices at 596 N. W. 54th St., Miami 38, Fla. Mr. Stiles reports that his new company will act as factory distributors for many nationally-known makes of materials handling equipment, conveyers, packaging machinery, and transmission parts in the state of Florida. He will maintain sales branches at Tampa and Jacksonville.

Technical Service Bulletin G-3, describing the characteristics and uses of lithium hydrozystearate has been published by the Witco Chemical Co., New York, N. Y.

Named Goodrich Purchasing Agent

Harold W. Catt

Harold W. Catt, associated with the Purchasing Division of the B. F. Goodrich Co. since 1940, has been named general purchasing agent of the company. Mr. Catt has been manager of textiles, paper products and advertising purchases in the Purchasing Division. A graduate in chemical engineering from the University of Illinois, Mr. Catt joined Goodrich in 1929 and was on the technical staff until 1940. He became manager of chemical and pigments purchasing in July, 1944.

Plant Maintenance Show Planned

The Plant Maintenance Show, attended each year by top executives of virtually every industry, has been scheduled for the Public Auditorium in Cleveland, Ohio, on January 19 to 22, 1953. The 1953 show will be almost 75% larger than its 1952 counterpart, according to Clapp & Poliak, Inc., which conducts the exposition. Exhibits will cover a gross area of 110,000 square feet. Compared to the first show in 1950, it will have almost four times as many exhibiting companies and cover about six times as much area. Three hundred and fifty companies are expected to conduct exhibits. The Plant Maintenance Conference, conducted by Clapp & Poliak during the first three days of the show, will also be held. Advance registration cards may be obtained from Clapp & Poliak at 341 Madison Avenue, New York 17, N. Y.

Sty-Fil Transparent Cement

A new transparent cement specially developed for fast biting action on smooth and uneven surfaces of polystyrene plastic molded parts has been announced by the Adhesive Products Corp., New York, N. Y. The new adhesive "Sty-Fil Transparent Cement" is said to be excellent for sealing sections where seams must be water and air tight, as in the manufacture of such items as toy water pistols. According to the company, the new product has the unique ability to "fill in" irregularities and ruptured areas while sealing joints. It is said to have equally powerful bonding properties on both even and uneven surfaces. The cement can be applied by conventional methods.

ASTM COMMITTEE D-11 SUBCOMMITTEES REPORT ON NEW YORK MEETING

As reported in the July issue of RUBBER AGE, the Annual Meeting of Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials was held on June 27th at the Hotel Statler in New York City, in connection with the 50th Anniversary Meeting of the parent society. The D-11 meeting was preceded during the week by meetings of its various subcommittees and the SAE-ASTM Technical Committee on Automotive Rubber.

Minutes of the subcommittee meetings have been made available and appear below. A formal report on the meeting of the SAE-ASTM Technical Committee on Automotive Rubber has not as yet been issued. However, it was reported that the committee recommended to D-11 some changes in the Silicone Table (Table 5) in D-735-52T and the addition of a new Table 6 covering polyacrylate rubbers.

The minutes of the meetings of the various subcommittees follow, the subcommittee chairman being indicated in the parentheses:

Subcommittee III — Thread Rubber (J. J. Allen): A questionaire covering the use of the Proposed Methods for Testing Rubber Thread published in 1950 had been circulated and answers returned. These were reviewed. It was agreed that the methods for determining yards per pound, Method A and Method B stress-strain, were being used and were satisfactory as printed.

The method for calculating the size of the thread would be satisfactory if the specific gravity could be determined more accurately. Another round-robin test will be carried out modifying the specific gravity method to specify a 50 cc pycnometer, a 0.2 gram specimen and alcohol as the liquid. Six manufacturers indicate they are using the Scott I-P2 machine for measuring stress-strain. Two members have the compensating carriage. Mr. Slovin and Mr. Cullison will comprise a committee of two to carry out some comparative tests. If in agreement they will prepare a tentative method for the use of this machine. The proposed methods will not be made tentative until this work is complete.

Subcommittee V — Insulated Wire and Cable (John T. Blake): The majority votes on two letter ballots were confirmed. Proposed general revisions of the wire and cable specifications prepared according to the plan agreed upon at the last meeting in Cleveland were presented and discussed at length. It was then voted to submit the revisions to the membership for letter ballot.

Subcommittee VI—Packings (F. C. Thorn): The chairman was authorized to appoint a section to explore the possibility of a product specification for red sheet gasketing. Section membership will be announced later. It was moved that D-733 be amended as follows: In paragraph 6, substitute for "the testing machine shall have a jaw separation speed of 12 inches per minute" the words "the rate of travel of the power-actuated grip shall be 12 ± 1 inch per minute." This is to conform to the wording of D-412.

Mr. Farnam reported for the section on Relaxation of Commercial Gasketing. A tentative method based on the Farnam-Cole Relaxometer and the Hopkins-Farnam jig (or capsule) was distributed. Work will be continued with the jig but employing also other types of load-recording mechanisms in addition to the Relaxometer. If the work has progressed sufficiently by October to warrant calling a special meeting of Subcommittee VI, such a meeting will be called. The method is urgently needed for use both in D-1170 and in the proposed red sheet specification.

Subcommittee VII — Rubber Latex (G. H. Barnes): The British Standards Institution latex testing specification (8192) was reviewed and corrections were suggested in answer to BSI request for comments.

The method for determination of the end point in the mechanical stability test was revised for better definition of the end point. The following change in D-1076-49T latex specification was recommended: "The end point is reached when a glass rod is dipped into the latex, lightly drawn once over the palm of the hand and small pieces of coagulated rubber are first readily seen in the thin film of liquid so deposited, and corroborated by a large increase in the amount of coagulum observed when the test has run 15 seconds longer."

It was recommended by the sub-committee that D-640-44 covering sampling of latex be withdrawn because it is now covered by D-1076-49T. An additional change in D-1076-49T is contemplated dependent on a letter ballot covering an improved sampling method, set up to insure accurate top and bottom specimens on latices which have a tendency to stratify into definite cream and serum layers on standing.

Due to the fact that the specified total solids content of the test sample in the mechanical stability test has been revised upwards from 51.5 to 55% total solids in a compromise agreement with the ISO/TC 45 committee, the 600 seconds specified in the method was tentatively reduced to 400 seconds to conform to the revised method. A note will be added to D-1076-49T to cover this change until the new limit has been tried out and the specification changed accordingly.

Working sections were set up or continued on the following: (1) Chemical stability; (2) Odor; (3) Film testing; (4) Density.

Subcommittee VIII — Glossary of Rubber Terms (Harry L. Fisher): The Glossary of Rubber Terms is being worked on actively now and it should appear fairly complete in the not too distant future. A glossary was published twenty years ago in the "Vanderbilt News;" it was a worthy undertaking under the editorship of William F. Russell and he became a member of the ASTM Committee for the new and enlarged glossary. The early glossary had about seven hundred terms and now there are twice that many, including those in the synthetic rubber industry.

The original ASTM Committee consisted of about 15 members. This number was too large as was found by experience. Words and their meanings were sent out and no replies were received from some members. Special work slowed down the outside activities of the chairman and then his removal from Stamford, Connecticut to Baltimore, Maryland and finally to Washington, D. C. practically stopped them. Recently he has collected new terms, especially those in the synthetic rubber industry, and the work is growing again.

It seems wise now to make up a new committee of three or four in addition to the chairman. They will probably come from the original committee and they will all be workers. Others can be called up for special terms.

The terms are all on cards. They will be defined and sent to the other members for their corrections and adoption. Some of the cards will be sent to members for them to define. In this way it is expected that the work will go forward with reasonable speed and bring it to a satisfactory ending.

Subcommittee XII — Crude Natural Rubber (Norman Bekkedahl): This subcommittee did not meet but reported as follows: Sub-Committee XII feels highly honored in that it was given the responsibility of staging the D-11 Symposium at this, the Fortieth Anniversary Meeting of Committee D-11. It is the personal opinion of the chairman that the meeting was a success in that eight excellent papers were presented on "Recent Developments in the Evaluation of Crude Natural Rubber". About 175 members and guests attended the meeting, which lasted for 3½ hours in a "hot box".

Subcommittee XV — Life Tests for Rubber Products (G. C. Maassen): Reports by sections of the subcommittee follow:

Section 1—Aging of Plastics (J. Breckley): Motion passed that this section be discontinued. Mr. Breckley will serve as liaison between D-20 and this subcommittee for items pertaining to Aging of Plastics.

Section 2—Correlation Between Oven and Shelf Aging (R. J. Lowry): Mr. Lowry reported that aging periods for two remaining sets of samples have not yet been determined. It was decided that the next tests would be conducted at the end of eight years. Subcommittee XXVIII (Statistical Quality Control) will analyze data submitted by this subcommittee and suggest effective method of presentation.

Section 4—Miscellaneous Properties and Their Effects on Life Aging (G. R. Reinsmith): Superior ozone resistance imparted to a 90-10 GR-S polymer has prompted a study of the relationship between the effectiveness of Tenamene 11 and the structure of the rubber. Among a large group of vulcanizates containing two parts of Tenamene 11, polybutadiene derives much more ozone resistance than the others. Whereas two parts of Tenamene 11 gave only slight ozone resistance to other polymers besides GR-S, four parts of this inhibitor is quite effective when used in natural, Paracril, Butyl, and Neoprene FR compounds.

Measurements on specimens elongated 10 to 50 percent indicates a maximum crack growth in the vicinity of 10 percent elongation. A flexing test employing 110

cycles per minute and producing elongations from 0 to 25 percent shows that the crack depth growth rate of dynamically flexed specimens is about half the rate of statically stressed specimens.

Ozone cabinet tests of an oven-aged 90-10 GR-S stock containing two parts Tenamene 11 shows that a large portion of the ozone resistance is lost after heating the unstressed stock two to four days at 158° F. and one day at 212° F. Weight loss tests on the same compound along with a control gives a 58 percent loss of Tenamene 11 after two days at 212° F. and a 40 percent loss after two days at 158° F. The following chemicals were incorporated into GR-S on a molar basis equivalent to two parts of Tenamene 11 and found to impart little if any ozone resistance: (1) *2, 2'* methylene bis (tertiary butyl hydroquinone); (2) *2, 5* ditertiary butyl hydroquinone butylated hydroxyanisole.

Work has resulted in the following data: Ozone Studies—Low percentages of nitrogen dioxide does not produce cracking of rubber; however, it does form a brittle film on the surface. Oxygen Studies—For regular and "cold" GR-S black stocks, definite amounts of oxygen absorbed from "air" had more effect on the tensile properties than the same amount of oxygen absorbed from "pure oxygen".

Proposed tentative method, "Volumetric Oxygen Absorption Test for Aging of Rubber Polymers and Vulcanizates", is to be held in abeyance until demand is created.

Section 5—Development of Test Methods for Ozone Resistance (A. E. Juve): Consideration was given to negative ballot of D-474, D-572, D-573 and D-865. Motion was passed that subcommittee recommendation to D-11 be reaffirmed.

Section 9—Calibrating Light Source (J. E. Norton): Chairman reported incomplete results from survey of questionnaires indicate very few laboratories use D-749. No recommendations will be made until more replies are received and work in progress on another method is complete.

Subcommittee XVII — Hardness, Set and Creep (Sherman R. Doner): The instrument committee under the chairmanship of Mr. C. G. Cashion presented a proposed revision of ASTM Designation D-314, Standard Method of Test for Hardness of Rubber. The proposed revision will be circulated to all members and to the visitors present at the meeting as it would have required too much time to discuss it in detail at the meeting. A sub-committee ballot will be attached to the proposal and future action will be guided by the replies. The revision consists primarily of specific instructions for proper care and maintenance of the instrument.

The ISO/TC 45 Document No. 149 was read, but no comments were forthcoming. Mr. C. K. Chatten submitted a brief progress report on stress-relaxation tests. It was proposed by Mr. Labbe, that the table in D-395-52T "Tests for Compression Set of Rubber" be amended to clarify the deflection table by specifying the "Durometer Hardness Numbers" as follows:

Proposal	*Present Table*
25 to 34 inclusive	30 ± 5
35 to 44 inclusive	40 ± 5
45 to 54 inclusive	50 ± 5
55 to 64 inclusive	60 ± 5
etc.	70 etc.

This is to eliminate confusion as to what deflection to use when a specimen falls on 45 or 65 durometer. The committee requests that this change be made editorially in the two "Compression Set Methods" D-395 and the Proposed "Tentative Method of Low Temperature Compression Set, etc."

Mr. J. I. Belfer, the Material Laboratory, N. Y. Naval Shipyard, presented an interesting paper on "Methods of Determining Compression Set of Elastomers at Low Temperatures". Special emphasis was placed on the use of a quick acting wrench to improve manipulation. The suggestion was made that this paper be published in the *ASTM Bulletin*.

Mr. J. Z. Lichtman, of the Material Laboratory, N. Y. Naval Shipyard, described in detail the modified Admiralty Indentometer which has been constructed by the Material Laboratory. It was suggested that this paper be published.

At the close of the meeting an informal discussion on hardness instruments was held. Four instrument manufacturers participated.

Subcommittee XVIII—Flexing Tests (B. S. Garvey, Jr.): With regard to the International Standards Organization and as agreed upon at the Akron meeting, the crack growth test has been written up as ISO/TC 45-115. This is essentially the same as ASTM D-813 as revised by this committee. The chairman, as representative of the committee, approved it. A cooperative test is under way. All specimens were prepared and pierced at the I.C.I. laboratories. One set was sent to Dr. Garvey for test in the U.S.A. The test is now under way in the Sharples laboratory. A report sent by Mr. Buist indicates that the results depend to some extent on whether the specimens are individually molded or cut from slabs. It is hoped that more information will become available on this point.

During the discussion of D-813 it was brought out that flex tests run outdoors seem to give better correlation with service than those run indoors. Some considered these to be ozone resistance tests run under conditions of flexing. Others felt that the cracking was also affected by such factors as light and moisture. Some of the work has been done on shoe uppers and might be of interest in connection with coated fabrics. It should also apply to tire sidewalls. The possibility of running DeMattia tests in an ozone cabinet was suggested. The work done to date has not been done with pierced specimens and, therefore, falls under Method D-430 rather than D-813.

A sectional committee was appointed to find out what information is available, to evaluate the situation, and to see if there is anything the subcommittee can or should do. The members of the committee are: K. L. Keene, chairman, B. N. Larson and D. E. Baker. Others who may have pertinent information and will cooperate with the committee are: J. Breckley, Ross Shearer, and H. G. Bimmerman.

Certain changes as to D-623-41T were recommended by Mr. Keen's sectional committee at the last meeting and were accepted by the subcommittee. These changes are given below. It is recommended that they be submitted to letter ballot in Committee D-11. They apply only to Method A—Goodrich Flexometer. As to the nature of the test, under paragraph 4, eliminate the phrase "or a constant deflection during the test."

Paragraph 6(a) covering test specimen, add, at the end, the following sentence: "No attempt should be made to test a specimen having a durometer hardness exceeding 85 Shore A." Add this paragraph: "An alternate test specimen—a truncated cone 0.77 inches in diameter at the bottom and 0.75 inches at the top by 1-inch in height—may be used. This specimen is easier to mold and the addition of a 1-pound weight on the back of the loading beam produces a stress of 5 psi on the specimen."

As to procedure, paragraph 7(c), add the following sentence at the end of the paragraph: "When testing at room temperature be sure the thermocouple is at room temperature at the start of the test." No other changes have been suggested and the method is considered acceptable for the next few years.

With reference to ASTM D-813-44T, the revisions of this method proposed by Mr. Shearer's committee last year have been submitted to letter ballot in Committee D-11. The revisions have been accepted although there were two negative ballots. The first dealt with the individual mounting of the specimens in the DeMattia machine. The proposed wording is such that individual clamps are permitted. The second objection was to the specified length of the stroke. Since the stroke length has not been changed this objection is really a suggestion to consider a further change. No further revisions of the method were suggested. Currently there is no further work planned.

Goodyear Flooring on New Ship

What is said to be the world's largest ship installation of rubber flooring covering almost 3½ miles of decks, passageways and other passenger areas on the new luxury liner, the SS United States, was recently completed. Some 170,000 square feet of rubber, including 17,000 feet of a specially molded marine blue deck tiling, and rubber sheeting in specially-formulated color schemes, were produced by the Goodyear Tire & Rubber Co. in its plants at Akron and St. Marys, Ohio for this installation. If placed in a single area, the flooring would cover some four acres. Selby-Battersby and Co. of Philadelphia, Penna., one of the nation's leading specialists in marine flooring installations, was in charge of this huge placement job, which required more than a year to complete.

A motion was made, seconded, and carried that the following editorial change be made in method ASTM D-1052-49T: Under apparatus, paragraph 2(b), at the end of this paragraph add the following sentence: "The diameter of the holes in the guide block shall be, respectively, not more than 0.010 inches longer than the diameter of the piercing tool, and not more than 0.010 inches longer than the diameter of the guide rods." No further change is being considered for this method.

The only future work now planned for this subcommittee is the continued cooperation with I.S.O. and the work of Mr. Keene's sectional committee on D-430-51T, Method B.

Subcommittee XX — Adhesion Testing (L. E. Cheyney): Proposed revision of D-429, the present standard for rubber-to-metal adhesion testing. Mr. Irvin of Marbon Corp. presented a proposed revised method, which other laboratories were requested to study. Like the present standard, it contains two parts: (a) a button or tension pull method, (b) a 90° strip method. The tension method differs from the present one in the use of a smaller bonded area (for economy of operation) and a thinner rubber piece (to reduce secondary stresses in the measurement). It is also proposed to include some operating directions in the new write-up. The strip method is that presented at the Cleveland meeting by Mr. Larsen of Lord Mfg. Co., which allows the test to be carried out with a Scott tensile tester.

Mr. Eller of the Brooklyn Navy Yard described the strip adhesion testing jig which is used there. It allows a 90° strip test to be carried out with an ordinary Scott tester. It is also applicable to end product testing.

Mr. Mathues of Inland Mfg. Div. of General Motors Corp. reported on additional work which he has done with the Buist-Naunton Impact Adhesion test. His results have thus far failed to show any advantages for this method. It does possess some disadvantages and the equipment is expensive. It was suggested that Mr. Mathues explore the subject further with Mr. Buist.

Subcommittee XXI—Rubber Cements and Related Products (J. F. Anderson): Agreement was reached with respect to the selection of illustrations for the Test Methods Relative to Brake Bonding. A program was developed for round robin testing by six participating laboratories, according to these new methods, to check the reproducibility of the results using identical materials. General Motors Research, Armstrong Cork Co., Chevrolet Gear & Axle Div. (GMC), Raybestos-Manhattan Corp., Inland Div. (GMC) and B. F. Goodrich have indicated willingness to assist in this work.

From the results of this testing program the subcommittee expects to establish a set of minimum values for specification purposes. Preliminary work has been done and indicates reliability of the test methods. Reports from a committee working under the chairmanship of Mr. B. B. Brombaugh confirm this opinion.

The materials to be used in the testing programs for the present at least, are: (a) 11 inch x 2 inch passenger car brake shoes; (b) Marshall 2201 Lining Material; (c) Bonding tape currently in use at Chevrolet Gear and Axle Co.

Mr. Westerman of the Ford Motor Company suggested an additional test method to meet requirements for shear test of shoe and lining assemblies at a predetermined rate of temperature rise under constant load, compression shear. This and other suggestions will be submitted by the chairman of Subcommittee XXI in the near future to the full subcommittee for official action, pending which the test methods are to be published as presently approved.

Subcommittee XXIII — Asphalt and Hard Rubber (C. P. Morgan): A general discussion on the proposed method for the Impact Testing of Asphalt Containers was held and a review of the various comments received prior to the meeting made. A number of revisions to the present draft were made and the recommendation that the proposed method be accepted and sent to letter ballot of D-11. A motion to this effect was made and approved.

The Hard Rubber Section met immediately following the meeting on asphalt containers, the same group attending. No further reports were made on the various investigations now underway except that work is in progress and will be reported on completion. The question as to whether a classification of hard rubber specifications could be set up similar to that currently in use for soft rubber was discussed and it was decided that further thought be given the matter for possible action at a later meeting.

Subcommittee XXIV — Coated Fabrics (Samuel H. Tinsley): Mr. Keene, sectional chairman on abrasion, gave a report on results obtained from tests made on the C.S.I. Stoll-Quartermaster Universal Wear Tester manufactured by the Custom Scientific Instrument Co. This report included results on only one grade of coated fabric, which was a vinyl-coated net. These tests indicate that the results are quite reproducible when they are run to the same end point and calculated to indicate the number of cycles necessary to remove .001-inch of coating. Copies of this four-page report were given to all present.

In the discussion that followed it was decided to further investigate this machine using various types of coated fabrics and abradants, and possibly run a round robin series of tests. It was also suggested that the Schiefer Abrasion Testing Machine be included in this work. Mr. Keene will follow this up promptly with all laboratories that have these machines available.

Mr. Roberts, sectional chairman on adhesion testing, gave his report which will be mailed to all members of this subcommittee. Of three points under consideration for modification in D-751-46T, only one has had sufficient study for recommendation. This refers to the distance of pull-down and we recommend the insertion into Sec. 39 (Procedure) of D-751-46T the sentence: "The distance of separation of the coating or plies shall be three inches." It is anticipated that recommendations on the other two points will be ready for the next meeting, together with additional test methods for thin films, particularly vinyl.

Mr. J. H. Bowen, Jr., of the Naval Air Experimental Station, gave a demonstration of, and a very interesting discussion on, a new flex testing machine that was developed at their station particularly for testing the quality of vapor barrier materials. This machine is called the Naes or Galbo Flex Tester. This was presented for the possible interest and application of such a machine for the evaluation of the resistance of coated fabrics to severe flexing.

Subcommittee XXV—Low Temperature Tests (R. S. Havenhill): Irving Kalm, reporting for Mr. Reinsmith, chairman of the committee considering the T-R test, read a report recommending that the temperature-retraction or T-R test with certain recommendations as to elongation and restrictions as to specification use be written up as a tentative ASTM test procedure. Motion was made, seconded and unanimously carried that the chairman appoint a committee to draft a tentative T-R test procedure. This committee is to be as follows: O. H. Smith, chairman, and R. F. Shaw, C. K. Chatten, J. F. Svetlik, C. B. Griffiths, and B. G. Labbe.

With reference to the Gehman torsional stiffness test (D-1053-49T), Mr. B. G. Labbe, chairman of the committee on Torsion Wire Standardization, circulated a report covering revised procedure for standardization of torsion wire, torsion wire constant limits of ± 3% of specified value, and a formula and table for calculating modulus of elasticity in pounds per square inch.

Insofar as ISO/TC 45 is concerned, C. K. Chatten, chairman of this section, presented a comprehensive report on all the different stiffness methods now in use for low temperature testing and recommended that the Gehman torsional stiffness tester be proposed as an ISO standard. Copies of his report were circulated at the meeting and additional copies are available on request. Other tests and recommendations for hardness, crystallization, etc., will be covered by Mr. Chatten at the next meeting. A. J. Kearfott mentioned the advantages of expressing stiffness in terms of the angle of bend.

Mr. Kalm read a report regarding the various low temperature methods selected and agreed upon by the Armed Services. These are as follows: (1) Stiffness—Gehman D-1053-49T; (2) Brittleness—D-746; (3) Hardness—P&I or Admiralty; (4) Elastic Recovery—T-R test or compression set or tension recovery.

The Armed Services preference for solenoid machines in D-746 is being considered because of some concern regarding agreement between solenoid and motor-driven equipment. Dr. A. G. Hanson reported on this and as a result a committee of the following members was appointed to investigate this problem: Dr. Hanson, chairman, F. L. Graves, D. C. Scott, W. N. Keen, and Bruce Lewis.

Subcommittee XXVII — Resilience (E. G. Kimmich); The Forced Vibration Section presented its survey of eight existing methods for determining resilience, damping and dynamic modulus

under forced vibration conditions. Subcommittee D-20 has made a similar survey of nine methods (one of which is included in our eight methods). The two committees have interchanged this information resulting in both groups having detailed knowledge of 16 methods. It is not yet clear how to bring standardization into this situation, but certainly these surveys have provided a necessary preliminary step.

On Method D-945, Yerzley Oscillograph, additional data which showed a marked effect of creep on resilience by this method were presented. Also a new proposal to change the dimensions of the shear sample was received and discussed. The subcommittee was fortunate in having Dr. Felix Yerzley present to give us a comprehensive view of the background of his oscillograph, and of its capacities and limitations, as well as some thoughts as to its improvement. A section was authorized to study and make recommendations on both of these items.

Where Method D-1050-A, Rebound Pendulum Test, is concerned, a section authorized in March has only recently been appointed. It is hoped that the round-robin test that is planned can be completed by the next meeting of D-11. The object is to determine the optimum initial angles for hard compounds, it having been reported that 20° is too large an angle for very hard stocks.

Subcommittee XXVIII — Statistical Quality Control (J. D. Heide): A motion picture on statistical quality control produced by the Johns-Manville Corporation was shown. A report by a sub group on its investigation of the relative merits of the use of the median versus the use of the arithmetic mean in reporting physical tests on rubber was approved. The report will be forwarded to Subcommittee X and will recommend the use of the median.

The request by Subcommittee XV for a method of analysis of rubber aging data was thoroughly discussed. A method of analysis has been developed but involves considerable computation. The results will be very limited in their use. The method will be authorized in a report to be forwarded to Subcommittee XV.

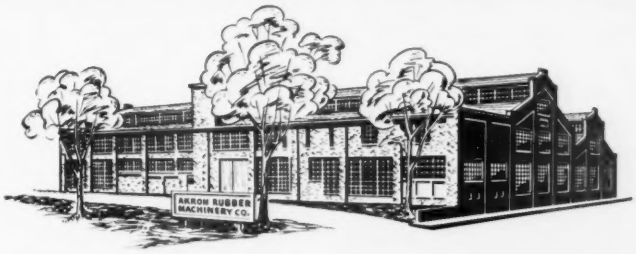
The task group working on the sampling of crude natural rubber reports a meeting with the other subcommittee. A preliminary report will be submitted.

There was considerable discussion at the meeting of the design of round robin testing to get results that are statistically sound. In view of the fact that many such tests are run which give results that may have no statistical basis, it is recommended that all subcommittees planning inter-laboratory tests submit the plans to Subcommittee XVIII for investigation of the experimental design.

At the next meeting, Mr. Mandel of the National Bureau of Standards will present a paper on the "Basic Principles of Inter-Laboratory Testing." Members of all subcommittees are invited to attend.

Fulton Leather Goods Co., New York, N. Y., is producing a new smartly-styled and roomy over-the-shoulder accessory bag made of Vinylite plastic sheeting.

ARTIST'S CONCEPTION OF NEW AKRON RUBBER MACHINERY FACILITIES



Depicted above is an artist's conception of the new facilities of the Akron Rubber Machinery Co. at 200 South Forge St., Akron 9, Ohio. The new facilities provide 50,000 square feet of floor space with a railroad siding and a 20 ton overhead crane.

Goodyear Forms New Department

A new department has been created by the Goodyear Tire & Rubber Export Co. known as the Special Products Department. Manager of the new department is P. W. Shamberger, associated with the Goodyear organization for the past 35 years and a member of Goodyear Export since 1923. J. S. Amrein has been appointed manager of the Films and Chemicals Products Section of the Special Products Department. Mr. Amrein joined Goodyear in 1938. The formation of the Special Products Department follows the recent combining of Goodyear Tire's Pliofilm, Chemical Products, and Specialty Products Departments.

Doughboy Vinyl Tub Toys

Doughboy Industries, Inc., New Richmond, Wisc., has introduced a new line of Vinylite tub toys. These toys are "junior" versions of beach toys previously introduced by the company. The Tub Toys have an inside bell rattle, and come with a valve for easy inflation. The line includes "Li'l Bulgy the Whale," "Li'l Swishy the Alligator," "Li'l Snapper the Turtle," "Li'l Splasher the Frog," and "Li'l Sandy the Sea Horse." The alligator, turtle and frog toys double as an inflatable soap dish, while the whale toy has a built-in water squirter. The sea horse has a floated bottom which enables it to float erect.

Mathematical Computing Service

Mathematical Computing Service has been formed at 105 Court Street, Brooklyn 2, N. Y., as consultants in applied mathematics. The new firm specializes in performing services for industries and universities desiring engineering calculations of a high degree of complexity and the treatment of related mathematical problems in the field of chemical engineering. An important function of the service is the mathematical formulation and complete solution of a problem from given physical data. The staff consists of consultants holding doctorate degrees who are qualified to treat problems in applied mathematics related to the physical sciences.

More Certificates of Necessity

The Defense Production Administration has issued a new list of approved Certificates of Necessity for accelerated tax amortization on new or expanded defense facilities. Certificates issued recently include:

Flexible Tubing Corp., Guilford, Conn., $100,863 for military flexible tubing.

Union Carbide & Carbon Corp., Tonawanda, N. Y., $751,000 for Silane and silicone products.

Columbian Carbon Co., Conroe, Texas, $395,000 for carbon black.

Monsanto Chemical Co., Texas City, Texas, $1,681,250 for vinyl resins.

Continental Carbon Co., Sunray, Texas, $82,706 for carbon black.

Cooper Tire Files Claim

Cooper Tire & Rubber Co. has filed a claim of $1,811,333 against the U. S. government to cover losses which it contends it suffered in filling government contracts at pre-Korean conflict prices. On July 1, the House of Representatives voted to refer the claim to the U. S. Court of Claims which will make "findings of fact" and report to Congress. The contracts involved covered the manufacture of tires and tubes for military vehicles.

Dow Chemical Names Chamberlain

L. C. Chamberlain, formerly manager of the Plastics Department of the Dow Chemical Co., has been named assistant to the director of research for the company. Raymond F. Boyer has succeeded Mr. Chamberlain as head of plastics and high polymer research while Dr. William C. Bauman succeeded Mr. Boyer as director of the company's physical research laboratory.

Firestone Plant Expansion

Firestone Textiles Division of the Firestone Tire & Rubber Co. has announced that its plant at Gastonia, N. C. is installing additional rayon processing equipment. The conversion is expected to be completed about September 1. The essential conversion necessitated the release of about 250 employees but it was hoped that production after conversion would justify re-employment of some of them.

NEWS IN BRIEF

Billfolds made of Neolite have been introduced by Philip Florin, Inc., of New York City. The "Royal Guard" billfold is now on the market.

Negotiations have been completed for United World Films to make a short subject entitled "Rubber Roads" for the Natural Rubber Bureau.

"Colloidal Carbon Its Properties and Uses" is the latest in a series of technical reports on Columbian colloidal carbons published by the Columbian Carbon Co. Ask for Vol. XI, No. 3.

Built-in adhesive characteristics and the mechanical stability of Lustrex styrene latices are outlined in a new bulletin prepared by the Plastics Division of the Monsanto Chemical Co., Springfield, Mass.

Carbide and Carbon Chemicals Co. has released a new technical bulletin describing the chemical, physical, and physiological properties of n-Butyl alcohol. Ask for Technical Information Bulletin F-7909.

Perfect sealing radiator caps, using Hycar rubber as the sealing material, are being turned out by the Stant Manufacturing Co., Connersville, Ind.

The National Safety Council has made four recent additions to its series of job training booklets. In shirt-pocket size, these attractive two-color booklets are designed for general distribution to the industrial worker.

The properties and uses of di-(2-ethylhexyl) adipate (DOA), as a primary plasticizer for vinyl resins are described in Technical Service Report E-3, issued by the Witco Chemical Co.

Hewitt Rubber Div., Hewitt-Robins, Inc., has installed a new snow melting system of wrought iron coils imbedded in the concrete pavement of the loading area at its plant in Buffalo, N. Y. A hot water and anti-freeze solution is circulated through the coils.

Reflecting the increasing use of heat seal coatings, the American Resinous Chemicals Corp., Peabody, Mass., has released Data Sheet C-66 covering a number of formulas designed for use on paper, glassine, aluminum foil, and cellulose acetate.

U. S. Rubber has appointed the Rubber Fabrics Co. of New York as distributor of its cast vinyl film laminated to knitted fabric. Rubber Fabrics will market the material under the trade name "Vinonit."

Lasko Strap Co. of New York City, has introduced a new watch strap made of Neolite. It has the appearance of fine leather but is waterproof and is said to wear longer than leather.

A new conduit seal manufactured by the Vapor Heating Corp., Chicago, Ill., is being used in railroad passenger car heating systems carrying 400° F. steam under 250 pounds pressure. Hycar is used as the sealing material.

Youngsters who play softball on the roof of the Division YMCA in Chicago, Ill., report fewer skinned knees and elbows since the base lines of their 28-foot softball diamond have been surfaced with a rubber compound produced by Goodyear.

"Synthetic Rubber Latex Paint" is the title of an interesting reprint available from Chemical Research Associates, Essex Building, Bernardsville, N. J.

Foxboro Co., Foxboro, Mass., has released a review of pH theory and it practical applications in industrial measurement and control. Ask for Bulletin 430-1.

H. W. North Co. has moved its headquarters and all divisions to 1701 Parade St., Erie, Penna., a three-story building purchased last year as part of a long-range expansion program.

The name of Thomas S. Lee Enterprises, Inc., has been changed to General Teleradio, Inc. General Teleradio is a subsidiary of General Tire and includes all of the company's interests in radio and television.

Rubber Manufacturers Association, 444 Madison Avenue, New York 22, N. Y., has mailed directly to some 21,000 farm tractor and implement dealers a combination letter-display poster carrying a correct inflation pressure message and listing the correct pressures for all sizes of front and rear wheels of agricultural tractor tires.

Responding to a long-felt need of users of molded rubber hose, the Thermoid Co., Trenton, N. J., has announced the consolidation of its molded hose line from 18 different types into five basic types, color-coded for identification according to use.

Philblack Sales Division of the Phillips Chemical Co., Akron, Ohio, has made available Philblack Bulletin No. 21 dealing with "Partial Substitution of Natural Rubber by Synthetic Rubber in a Tread Recipe."

"Midco-B with an Oil-GR-S Masterbatch. I," is the title of a new report issued by the Midwest Rubber Reclaiming Co., East St. Louis, Ill. Ask for Report No. 17.

American Cyanamid Co., New York, N. Y., has announced the publication of "Cyanamid Metallic Stearates," a booklet which describes revised specifications of many grades resulting from recent research by the company in the stearate field.

American Resinous Chemicals Corp. and the American Polymer Corp. have named the Vulcan Sales Co., Kansas City, Mo., as agents for the states of Iowa, Nebraska, Kansas, Oklahoma, Northern Texas and Western Missouri.

Thermoid Co., Trenton, N. J., has published an eight-page pamphlet in four colors which describes their new "Basic Five," color-coded, multi-purpose industrial hose line. The five hose types in the new line replace 18 hose types offered formerly.

Leinart Engineering Co., Knoxville, Tenn., has been named distributor for O-ring seals manufactured by the Parker Appliance Co., Cleveland, Ohio.

Dow Corning Corp., Midland, Mich., has published a new technical report covering its improved Silastic R Tape. Ask for Data Sheet G-25.

The Rubber Manufacturers Association has just published a revised 17 by 22-inch display chart containing the correct tire inflation pressures for all makes of passenger cars in the 1949, 1950, 1951 and 1952 models.

General Electric Co., Schenectady 5, N. Y., is distributing a new perpetual calendar which extends from 1753 to 2059, and which can easily be extended to an indefinite future year.

Standard Machinery Co., Mystic, Conn., has just published a new 12-page illustrated catalog featuring its latest models of extruding and vulcanizing equipment for the rubber and plastics extrusion industries.

A new 21-page booklet describing Simplytrol Contact Meter-Relays has been published by Assembly Products, Inc., Chagrin Falls, Ohio.

Warwick Chemical Co., Long Island City 1, N. Y., has announced the availability of a new booklet describing a complete line of surface active agents.

Superior Materials, Inc., New York, N. Y., has established warehouse stocks in Boston, Mass., in order to supply the growing demands for A.S.P. pigments in the New England area.

Tackifying and reinforcing resin emulsions for both natural and synthetic rubber latex are described in a new data sheet by the American Resinous Chemicals Corp., Peabody, Mass. Ask for Data Sheet A-42.

Warwick Wax Co., subsidiary of the Sun Chemical Corp., has announced the appointment of Van Waters and Rogers, Inc., as exclusive distributors in the Pacific Northwest.

Federal Products Corp., Providence, R. I., is making available a new 16mm, full color and sound film, "Gaging for Profit." The film may be borrowed by industrial concerns for one or two-day showings.

Badenhop Marks 50th Anniversary

Robert Badenhop

On July 17, 1952, Robert Badenhop, chairman of the board of the Robert Badenhop Corp., New York, N. Y., celebrated his fiftieth anniversary in the crude rubber business. Born in Hamburg, Germany, in June, 1882, Mr. Badenhop first entered the crude rubber business in July, 1902. For two and one-half years he was associated with a firm in London, then returned to Hamburg where he became a sales representative for some of the largest rubber importers.

In April, 1907, Mr. Badenhop arrived in New York where he became assistant to the manager of a crude rubber import company. In November, 1909, he established his own business in New York as a rubber importer and broker. From this small beginning, the firm, in 1924, became the Robert Badenhop Corp. and went on to become one of the largest and best-known firms in the rubber import business.

Mr. Badenhop was one of the pioneers in the formation of the Rubber Trade Association of New York and helped in the establishment of equitable trade rules and a uniform contract which provided for the settlement of disputes by arbitration. Mr. Badenhop was president of the association from 1936 to 1938. He is also a founder of the Rubber Exchange, now the Commodity Exchange, Inc., and is president and chairman of the Commodity Exchange Rubber Clearing Association.

Mr. Badenhop's two sons, Robert A. and Norman, are presently associated with the firm as treasurer and secretary, respectively. G. LeRoy Scheindler is president of the firm while Murray Millenthal is vice-president. Both have been associated with the company for more than 30 years. Harry J. Braker, chief rubber inspector, and George R. Mahoney, traffic manager, have been associated with Mr. Badenhop for 42 and 33 years, respectively.

Seventy years old on June 12th, Mr. Badenhop looks upon his business career as a romance. Widely traveled, he speaks five languages fluently. He has served the rubber industry from the time that manufacturers had to rely on wild rubbers for their supply to the highly specialized present, making his business career truly unique.

Anaconda Wire Names Fitzpatrick

S. D. Fitzpatrick has been appointed assistant to the president of the Anaconda Wire and Cable Co., while several sales executives have been advanced to new positions with the company. Executive changes in the Sales Department include appointment of C. H. Porter and M. J. McCarthy as assistant sales managers; A. W. Koch as manager of sales, Magnet Wire Products; C. B. Peck, manager of sales, Rubber and Plastic Insulated Products; J. L. Tindale, manager of sales, Bare and Weatherproof-Power Cable and Accessories; A. W. Tracy, new district manager for the Los Angeles office; and K. G. Eaton, district manager of the Denver office. Before his present appointment, Mr. Porter had been manager of industrial sales, and Mr. McCarthy had been manager of magnet wire sales. Mr. Koch was formerly assistant to Mr. McCarthy, and manager of customer service. Mr. Peck was manager of portable cable sales and assistant manager of industrial sales. Mr. Tindale formerly was district manager for the Los Angeles office, while Mr. Tracy had been manager at the Denver office where Mr. Eaton had been district engineer.

New Goodrich Tubeless Tire

The development of a new tubeless passenger car tire, companion to the company's Life-Saver Puncture-Sealing tubeless tire, has been announced by the B. F. Goodrich Co. The new tire, because it will not include the puncture-sealing construction or the "Grip Block" tread of the Life-Saver tire, will be priced lower when offered for sale, the company said. The new tubeless tire retains many of the safety features of the Life-Saver, including longer mileage, improved riding qualities and protection against blowouts, according to the company. Company officials declared that this new companion tire eliminates all the disadvantages of inner tubes. Goodrich also indicated that tubeless tires for airplanes, trucks, buses, tractors and farm implements are now in the offing.

VINYL SPECIALTIES

Quick changing for youngsters still in diapers is provided by new snap-one creepers with built-in linings of Vinylite plastic film for extra accident prevention. "Snap-E-Creepers" are manufactured by the Miller Art Manufacturing Co. of New York City.

Colorful Geon vinyl plastic Halloween goblins, witches, cats, pumpkins, and bats which stick to any polished surface without the use of tacks, adhesives or water are being produced by the Educational Products Co., Andover, N. J. The decorations, called "Applical," are applied by simply pressing them against any smooth, clean surface.

Pockets are protected from hard-to-launder pencil and ink marks as well as from wear by a new type liner made from Vinylite plastic sheeting by Angler's Products Co., Flushing, N. Y.

Joins National Polychemicals

Edward V. Osberg

National Polychemicals, Inc., Boston, Mass., has announced the appointment of Edward V. Osberg as general manager to direct the firm's over-all activities. National Polychemicals was recently formed for the purpose of manufacturing and selling specialty organic chemicals. The new company is selecting a plant site near Boston and expects to have operations under way within a year. The firm's activities will be centered in several related chemical fields. Plans are under way to organize a research and development group, and emphasis will be placed on new product development. Mr. Osberg comes to National Polychemicals from the General Tire & Rubber Co. where he served as assistant manager of the Chemical Division. Previously, he was vice-president of the Wilmington Chemical Corp. and earlier, editor of the *India Rubber World*. Mr. Osberg is a member of the American Chemical Society, the American Institute of Physics, and the Chemists' Club of New York.

Dow Chemical Plans Expansion

Dow Chemical Co., Midland, Mich., has announced the formal completion of a public offering of $100,425,000 3% convertible subordinate debentures by a nationwide group headed by Smith, Barney & Co. At a luncheon marking receipt of a check in the full amount, Leland I. Doan, president, and Earl W. Bennett, chairman of the board, disclosed that the company is acquiring sites for further expansion in the future and, among other things, may get into the manufacture of titanium. The company and its subsidiaries has spent approximately $441,000,000 on expansion projects during the past few years. It was said that the proceeds of the debenture offering will be used chiefly in the company's expansion program over the next few years. It was also indicated that the company had received Certificates of Necessity from the government to build plants costing $265,000,000 under accelerated amortization. About 54% of this, or $145,000,000, will be subject to accelerated write-offs.

NEW RUBBER PRODUCTS

Ace Rubber Garage Floor Mat

Ace Rubber Products, Inc., of Akron, Ohio, has introduced a giant size rubber mat which is being adapted to many uses in the automotive field. The mat is 38 by 60 inches and is made of neoprene, thus offering special resistance to oils and greases. The mat finds particular use on garage floors where drippings of oil and grease are an annoyance. Cross-ribs on

the mat prevent drippings from running to one end when the garage floor slopes and a beaded edge keeps the oil and grease on the mat. Among other uses, the new mats may be placed in doorways, in front of cash registers, parts counters and other places where service men and mechanics are likely to track oil and grease on the floor. They are also used in front of oil dispensers and places where it is desired to catch excess oil or grease spilled on the floor.

Grip-Safe Tubing Manipulator

Central Scientific Co., Chicago, Ill., is producing a new unit designed to protect the hands against the accidental breakage of glass in the laboratory. It is the "Grip-Safe Manipulator" for inserting glass tubing in rubber stoppers or corks.

The device holds the tubing securely without excessive pressure and eliminates the necessity of wrapping a cloth around the tubing. Made of high quality rubber with a large parabolic shield at the front, it fully covers the hand, knuckles and wrist. It fits the most common sizes of tubing, and will even take glass T's and bends.

Mermaid Bathing and Shower Caps

A new line of glamorous bathing caps for both beach and shower has been introduced by Topstone Rubber Toys Co., Bethel, Conn. Molded of soft natural latex, each cap is decorated in natural colors. The caps are molded with various designs including flowers, sea shells, ribbons, etc., all colored accordingly. Called "Mermaid Caps", they are available in two sizes, medium and large.

Ensolite Practice Golf Ball

To help the golfer improve his game, U. S. Rubber Co. has introduced a new type of practice golf ball, so sensitive to the way it is hit that it will indicate to the golfer a hook, a slice, or other faulty swing which can be corrected by practice. It will also help give the golfer steady stance and smooth follow-through, the company said. The new and different practice ball is a molded, dimpled ball that looks like a real golf ball in size, color and appearance. It is made of the company's Ensolite, the expanded cellular plastic containing thousands of non-connecting gas cells. Since 90% of its volume is gas, it is very light, weighing only ½ as much as a regular golf ball. Because of its light weight and soft feel, the U. S. Ensolite practice ball can be safely used indoors without harm to furniture or windows. Outdoors, it is easy to retrieve, for its flight distance with good drives averages only a little over 100 feet. Moreover, it is durable and will retain its shape.

Auburn Brick Building Set

Auburn Rubber Corp., Auburn, Ind., is now producing an interesting new toy, the "No. 601 Brick Building Set." The set contains 160 rubber building bricks in a balanced assortment of needed shapes; whole brick, top brick, half brick, quarter

brick, and foundation brick. The production mold carries a modification to embody in each of the individual bricks a raised guiding edge for easier insertion of brick to brick, in the child's hands. The set also includes a 12-page design booklet, a door set, window set, and 2 roofs.

Slip-On Rubber Recoil Pad

A new "slip-on" rubber recoil pad for rifles and shotguns which protects against the heaviest loads is being produced by the Dewey & Almy Chemical Co. Made of tough neoprene rubber for long wear, the new recoil pad slips easily over the stock. The cushioning pad is made of soft sponge rubber. Bright red in color, the recoil pad comes in three sizes to fit stocks from 410 to 10 gauge.

Pliatex Mold Rubber Kit

Sculpture House, New York, N. Y., has introduced a complete new hobby kit for making rubber molds. The "Pliatex Mold Rubber Kit" allows even the most inexperienced to make their own rubber molds

quickly and easily. The kit contains a half pint bottle of Pliatex mold rubber, separator fluid, dividing brass, a Duron plastic modeling tool, applicator brush and a brush cleaner. In addition, the kit contains an illustrated instruction booklet.

U.S. Royal Cel-O-Crepe

U. S. Rubber Co. has announced that it is in volume production of synthetic crepe rubber soles and heels that are light in weight and very durable. Called "U. S. Royal Cel-O-Crepe, they are being sold in sole and heel combinations to manufacturers of men's, women's and children's shoes. The cellular synthetic crepe material is also being sold by the rubber company in 36 by 36-inch sheets to shoe manufacturers who do their own cutting of outersoles. U. S. Rubber is currently supplying Cel-O-Crepe in white, natural, red, chocolate, and black. It is made in a stippled design with a crepe-like appearance, as well as in a smooth design with a sanded, velvet surface. Both are being produced in a variety of thicknesses to meet the needs of shoe manufacturers. In addition to its light weight and durability, Cel-O-Crepe is flexible, comfortable and resilient.

Topstone Rubber Bicycle Saddle

Topstone Rubber Toys Co., Inc., Bethel, Conn., is now marketing a new all-rubber bicycle saddle. Called the "Western Saddle", it fits all bicycle seats and is easily

demounted. Made of soft natural latex, it cannot injure children while playing or riding. Attractively modeled in the shape of a true saddle, the Western saddle gives the impression of real leather.

Vinyl and Styrene Certificates

The Defense Production Administration, from time to time, issues lists of new Certificates of Necessity for accelerated tax amortization on new or expanded defense facilities. Of late, DPA has issued a considerable number of certificates covering vinyl resins and styrene. Certificates issued recently on new or expanded vinyl resin facilities include the following:

Firestone Tire & Rubber Co., Pottstown, Penna., $6,022,700; Dow Chemical Co., Allyn's Point, Conn., $9,982,000; Shawinigan Resins Corp., Springfield, Mass., $100,350, $33,000 and $919,000; Monsanto Chemical Co., Springfield, Mass., $92,000; American Monomer Corp., Leominster, Mass., $160,500; National Starch Products, Inc., Plainfield, N. J., $253,475; U. S. Rubber Co., Painesville, Ohio, $3,297,725; Dow Chemical Co., Midland, Mich., $4,387,600 and $5,920,000; General Tire & Rubber Co., Calvert City, Ky., $5,319,000; B. F. Goodrich Chemical Co., Calvert City, Ky., $5,871,000; Union Carbide and Carbon Corp., Texas City, Texas, $13,837,000; Dow Chemical Co., Freeport, Texas, $5,930,000; Diamond Alkali Co., Deer Park, Houston, Texas, $2,526,000. The following companies were issued certificates covering new or expanded defense facilities for styrene:

Pennsylvania Industrial Chemical Corp., Jefferson, Penna., $3,807,650; Union Carbide & Carbon Corp., Kanawha County, West Va., $1,081,700; Pathfinder Chemical Corp., Point Pleasant, West Va., $11,496,320; Dow Chemical Co., Midland, Mich., $3,250,000; Marbon Corp., Gary, Ind., $70,045; Dow Chemical Co., Freeport, Texas, $9,400,000; Monsanto Chemical Co., Springfield, Mass., $87,565; Dow Chemical Co., Allyn's Point, Conn., $3,314,500; Catalin Corp. of America, Fords, N. J., $628,210; Monsanto Chemical Co., Springfield, Mass., $157,915; Goodyear Tire & Rubber Co., Akron, Ohio, $1,762,000; Union Carbide and Carbon Corp., Marietta, Ohio, $2,722,000; Monsanto Chemical Co., Addyston, Ohio, $3,673,270; Dow Chemical Co., Torrance, Calif., $1,723,000; and Monsanto Chemical Co., Long Beach, Calif., $133,120.

Tubeless Pneumatic Planter Tire

A new "Tubeless Pneumatic Planter Tire," said to be the first of its kind, has been developed by the B. F. Goodrich Co. Designed as a press wheel for use on corn and cotton planters, to replace steel wheels, the tire was tested this spring in corn and cotton-growing areas throughout the country with excellent results, the company states. The new tire has a low-section with an over-all diameter of 20 inches. It operates at low inflation pressures ranging from 4 to 8 pounds of air. Farmers who have used the tire report it allows uniform planting depth in all soil conditions because there is no soil build-up. The soil is pressed in more direct contact with the seed, producing quicker germination and more uniform stand. There is less side-slip on hillsides, which results in straighter rows. Also, there is said to be less washing and soil erosion in tire tracks after rains and less shock to the planter during transport and in the field.

United Carbon Personnel Changes

Jack B. Barr

United Carbon Co., Inc., of Charleston, West Va., has announced two changes in their Eastern District Sales office with headquarters in New York City. William S. Rea has been promoted to general sales consultant, a position formerly held by the late William W. Higgins. Jack B. Barr has succeeded Mr. Rea as eastern district manager. Mr. Barr is widely known in the industry, having been connected for a number of years with the Charles Enu Johnson Co. of Philadelphia, before it was acquired by United Carbon in December, 1949.

Consolidates Sales Activities

Consolidation of all sales activities for molding and extrusion plastics sold by the Bakelite Co., a division of the Union Carbide and Carbon Corp., was recently announced. John D. Bendito has been appointed manager of the new Molding and Extrusion Materials Department. In his new capacity, Mr. Bendito will be responsible for the sale of all molding and extrusion materials, including phenolics, polystyrene, polyethylene and vinyls used for these applications. David A. Munns has been named manager of the Molding and Extrusion Materials Division which will function as a part of Mr. Bendito's new department which will also supervise activities of the Wire and Cable Division headed by J. E. Brister. Prior to this new consolidation, sales activities were carried on by two separate groups known as the Thermosetting and Thermoplastics Departments.

Seiberling Rubber Names Johnson

Walter T. Johnson has been named assistant general sales manager for the Seiberling Rubber Co., Akron, Ohio, as of September 15. Associated with the company for the past 25 years, Mr. Johnson started as a salesman in Arkansas, and has been district manager at Buffalo, N. Y., and Boston, Mass., before transferring to Atlanta, Ga., as district manager, the post he held before his new appointment. Ralph C. Johnson, brother of Walter T., has been named to the Atlanta Post. George Rice, former sales representative in the Atlanta territory, has been named assistant district manager there.

Agilide Polyvinyl Chloride

A specially compounded, unplasticized polyvinyl chloride which is free from copolymers or any other additives used as processing aids in most other polyvinyl chloride compounds of the "rigid" type, has been introduced by the American Agile Corp., P. O. Box 168, Bedford, Ohio. Named "Agilide", the new material is said to offer the maximum in corrosion resistance of any polyvinyl chloride compound in combination with the necessary physical properties required of a thermoplastic structural material. Some of the more important applications of Agilide fabrication include pipe and pipe installations, containers and tanks, and apparatus and equipment such as exhaust hoods and systems, reaction vessels, acid pumps, valves, etc. Agilide is red in color with a specific gravity of 1.41. It has a tensile strength of 7,500 to 8,200 psi and a compressive strength of 10,500. Flexural strength is 14,000 psi. It has a hardness of 120 Rockwell R-Scale and absorbs less than .25% at 70° F. The product is said to offer excellent chemical resistance at temperatures up to 175° F. against mineral acids, both concentrated and dilute; alkalies and mineral salt solutions; organic acids, including acetic acid; and alcohols, cresol, phenol, glycol, oils, etc. Agilide does not resist the chemical actions of concentrated oxidizing acids, as well as acetone, ketones, ethers, esters, aromatic hydrocarbons, and chlorinated hydrocarbons.

"Chem-Set" Tile Adhesive

According to the Pioneer Latex & Chemical Co., Middlesex, N. J., the potential use of rubber tile for flooring has been increased substantially by a new development which now makes it possible to install rubber tile on grade concrete. A new chemically-set adhesive, called "Chem-Set," will not deteriorate when exposed to moisture and can now be used to cement tiles to on-grade concrete. The product is the result of combining a specially formulated latex and a catalyst vulcanizer (powder) so as to produce both a chemical set and an effective bond between rubber tile and cement, even in the continuous presence of moisture. While the new product does not waterproof a concrete surface, it does provide an adhesive bond that will not let go in the presence of moisture. Chem-Set is applied almost exactly in the same manner as ordinary adhesives.

Fire Destroys Natural Rubber

A fire that destroyed tons of government-owned natural rubber at Clarksburg, West Va. on July 11, caused damage estimated "conservatively" at $30,000,000. Security reasons prevented an exact accounting of the loss in the warehouse fire, since the government would not say how much natural rubber it lost. The rubber supply was one of the major items burned in the warehouse facilities of the General Storage Co. Sparks from a welder's torch in the warehouse area were tentatively blamed for the fire.

Adds Vinyl Film Printing

A complete vinyl film printing service has been added to the operations of the Firestone Plastics Co., Pottstown, Penna. A full line of stock prints, a variety of surface finishes, and a contract printing department for exclusive designs will be available to the trade. According to company officials, this development puts Firestone Plastics in the unique position of being the only company in the vinyl industry offering a fully-integrated service, from the raw material through the finished film and sheeting. The company formerly confined its film and sheeting production to plain colors, in smooth or embossed finishes, while all film prints were handled by the Hartford Textile Corp. of New York. Hartford will continue to handle the retail yard goods sale of Velon films under the trade name of "Beautafilm", both printed and plain, and in an expansion program will add a line of Velon upholstery sheetings for retail yard goods sale. All manufacturer accounts formerly serviced by Hartford will hereafter be handled directly by Firestone Plastics. Sales personnel of Hartford's manufacturers' sales division has been absorbed by Firestone Plastics Co., so that there will be no lapse in customer service. Firestone Plastics is now in a position to control production of Velon films from the raw material through copolymerization, processing, embossing, and printing, with the result that quality control can be assured, the company stated.

U. S. Revere Battery Separator

A new plastic battery separator, designed to replace the conventional wood separator in automobile batteries has been announced by the U. S. Rubber Co. The new product, developed by the Wire and Cable Department, is called the "U. S. Revere" and is priced slightly higher than wood separators but costs half as much as the rubber type made by the company. Company officials said that the plastic product is tougher than wood and will last 50% longer. It is more porous, permitting faster circulation of acid with greater starting power. It withstands heat and overcharging and eliminates short circuits caused by splitting of separators. In addition, U. S. Revere has improved capillary action to bring moisture to the top of plates when water runs low, thus preventing battery failure. It is uniform in quality, said company officials, because it is made by a chemical process which can be scientifically controlled, thus eliminating pinholes, cracks and other flaws.

Person Joins Baird Rubber

William P. Person, formerly associated with the South Asia Corp., has joined the staff of the Baird Rubber & Trading Co., Inc., New York, N. Y. Mr. Person was originally with Baird Rubber from 1938 until 1941, at which time he left the company. In 1946, he joined South Asia. In his new capacity, Mr. Person will speak with Baird Rubber customers over the telephone from the company's New York office. He is fully authorized to consummate any transaction in natural rubber on the company's behalf.

LOS ANGELES NEWS

Design and engineering work are underway for a new plant to be constructed in Los Angeles County by the Carbide and Carbon Chemicals Co. for the manufacture of polyethylene and ethylene glycol. The Defense Production Administration has issued Certificates of Necessity for the project which will involve an eventual investment of upwards of $36,000,000. The plant is being designed to produce from 50,000,000 to 60,000,00 pounds of polyethylene and from 5,00,000 to 10,000,000 gallons of ethylene glycol a year. It is estimated that the new plant will give employment to 250 to 350 persons, many of whom will be technically trained.

Following the recent completion of its new general office, warehouse and shipping building at 1659 East 23rd Street in Los Angeles, the Commercial Rubber Co. has modernized and re-equipped its factory at 1601 East 24th Street. The 24th Street plant, which until completion of the new building served as both general office and factory, has been equipped with additional mill facilities to provide a production capacity of 300,000 pounds of camelback per month. Among other new equipment is a conveyor system for expediting the movement of camelback from the tuber to the Rolling and Packing Departments. The new 23rd Street structure provides the firm with 7,600 square feet of floor area. The 80 by 95 foot building was constructed at a cost of $40,000.

Durethene Corp. has announced the construction of a new plant in Los Angeles for the production of polyethylene film. The new factory will soon be in production for the company's customers on the West Coast.

Lefferts Color-Wall Tires

Lefferts Color-Wall Tire Service, 7510 Rockaway Boulevard, Woodhaven, N. Y., has introduced a new method whereby car owners can choose a matching or contrasting color-walled tire for his automobile. The process involves the vulcanization of a colored strip of rubber to the wall of the tire. "Color-Wall" tires can be purchased from new car dealers while used whitewall tires can be converted easily. Color-Wall tires are now being offered in five different colors. The tires are guaranteed to last as long as whitewall tires.

Colton Acquires New Division

Colton Chemical Co., Cleveland, Ohio, has purchased the Flotofoam Insulation Division from the U. S. Rubber Co. Acquiring the production process and rights to "Flotofoam" insulation is the latest step in Colton's program of making available a wide variety of plastic products. Flotofoam insulation, a urea formaldehyde plastic foam, will henceforth be produced by Colton under the name "Colfoam."

High-Speed Tubeless Tire

A new passenger car tire that has been specifically developed for the new, more powerful, higher-speed automobiles, has been announced by the Firestone Tire & Rubber Co. This new tire incorporates racing-tire construction principles and does not have an inner tube. It has successfully passed outdoor road tests at sustained speeds well over 110 miles an hour, the company stated. The new tire is of low-pressure, super-balloon construction. It has an inner lining that provides puncture and blowout protection and it incorporates race-tire construction principles and new rubber compounds proved in this year's Indianapolis 500-mile race. The new tire also has the latest type non-skid tread design with specially cut traction slots in the silent running tread. Firestone says that the new tire will run at much cooler temperatures at higher speeds because it is stronger and lighter in weight than present tire and tube combinations. Through elimination of the tube, both the static and dynamic balance of the tire are greatly improved and this, in turn, assures smoother running at all speeds. The tire incorporates improved carbon blacks and cold rubber in the tread which is bound into the body by the same materials and methods used in race-tires.

Goodrich Portable "Pipeline"

A new portable fuel supply "pipeline" has been developed by the B. F. Goodrich Co. in cooperation with the Engineer Research and Development Laboratories. Intended for the delivery of gasoline and other liquid fuels to forward dispensing points, the developmental hose line may in the future provide means of rapidly transporting bulk supplies in the quantities required by combat elements of the Armed Forces. The "pipeline" has a four-inch diameter, weighs less than one pound per foot, and has a 500 pound burst pressure, making it the strongest hose for its weight ever built, the company said. Synthetic rubber is used throughout the hose which can be laid from a vehicle at rates up to 15 miles per hour. One such hoseline can transport 41 tons of material per hour, 24 hours a day. Its daily capacity is equal to that of 162 two-thousand gallon tank trucks.

Aldrich Pump 50th Anniversary

Aldrich Pump Co., Allentown, Penna., is this year celebrating its 50th Anniversary. The company is one of the oldest and one of very few companies specializing in the manufacture of reciprocating power pumps—pumps ranging from 5 to 2400 horsepower. The firm was originated as the Aldrich Pump Department of the Allentown Rolling Mills. The latter company, with a background of almost 107 years, ended its existence on November 30, 1951, through merger into Aldrich Pump. Today, Aldrich Pump manufactures reciprocating pumps for high pressure service such as the operation of presses for forging or extruding, for die casting machines, plastics and rubber molding, pumping liquid hydrocarbons and many other uses.

OBITUARIES

Lammot du Pont

Lammot du Pont, former president of E. I. du Pont de Nemours & Co. and the youngest of the three brothers who led the twentieth century development of the 150-year old company, died on July 24 at the age of 71. Mr. du Pont served as president of the company from 1926 to May, 1940, when he resigned as president to succeed his brother, Pierre, then 70, as chairman of the board. Lammot du Pont retired as board chairman in January, 1948. Born on October 12, 1880 Mr. du Pont received his degree in civil engineering from the Massachusetts Institute of Technology in 1901, and joined the family business in 1902. In 1915, he was elected a director and member of the Executive Committee, and the next year was made a vice-president. He became a director of the General Motors Corp. in 1918, serving until 1946. He was also chairman of that corporation's board of directors from 1929 to 1937, and was, for a time, a member of its Finance and Policy Committees. For a number of years, he was prominently identified with the Manufacturing Chemists' Association, which he served as president, the National Association of Manufacturers, the Chamber of Commerce of the United States, and other national bodies representing industry.

Stephen P. Turke

Stephen P. Turke, general manager of the Davidson Rubber Co., Charlestown, Mass., died on July 3 at Peter Bent Brigham Hospital in Boston, Mass. He was 38 years old. A graduate of the Bentley School of Accounting, Mr. Turke had also attended Boston University. He had been associated with Davidson Rubber since 1939. He was a member of the American Chemical Society and past director of the Cambridge Chamber of Commerce. Services were held in Milton, Mass. He is survived by his wife a son and a daughter.

Henry E. Guilford

Henry E. Guilford, retired superintendent of the U. S. Rubber Co. plant at Naugatuck, Conn., died on July 3 at St. Raphael's Hospital in New Haven, Conn. He was 70 years old. Mr. Guilford retired two years ago after having been with the company for 45 years. Born in Boston, Mass., Mr. Guilford was past master of the Malden, Mass., Masonic Lodge. Interment was in Hudson, Mass. He is survived by his wife.

Goodyear has installed conductive rubber wall panels in the dugout of the Cincinnati Reds so that players will be warm during night games and cold days.

Robert M. Graham

Robert M. Graham, director of purchases for the General Tire & Rubber Co., died of a heart attack on July 9 at his office in Akron, Ohio. He was 61 years old. Widely-known in the rubber industry, Mr. Graham served as a rubber buying agent for the General Services Administration during World War II. A native of Sidney, Ohio, Mr. Graham was graduated from Miami University in 1913 with a degree in chemistry. He entered the rubber industry immediately after graduation. He joined General Tire in 1928 as a development engineer. A year later, he was placed in charge of industrial engineering and in 1932 was transferred to the Purchasing Department. During the first World War, Mr. Graham served as a captain in the Chemical Warfare Service of the U. S. Army. A member of the National Purchasing Agents Association, Mr. Graham was past-president of the Akron chapter. He was also a Mason, a member of the American Legion and the University Club. Services were held on July 12 at Westminster Presbyterian Church in Akron with burial in Rose Hill Cemetery. Mr. Graham leaves his wife and two daughters.

Joseph W. Mullally

Joseph W. Mullally, manager of utility sales for the Anaconda Wire & Cable Co., died on June 10 while on a business trip to Washington, D. C. He was 54 years old. Mr. Mullally was born in St. Louis and attended Notre Dame University. He enlisted in the U. S. Navy in 1917 and remained in service for 13 years, part of the time as a Naval aide to President Calvin Coolidge. He joined Anaconda in 1930 as district manager in Pittsburgh and was named utility sales manager in 1951. During World War II he served as chief of the Wire Mill Branch of the Copper Division of the War Production Board. Later he was named deputy director of the Copper Division, National Production Authority. Mr. Mullally is survived by his wife.

James C. Heintz, Sr.

James C. Heintz, Sr., president of James C. Heintz & Co., Inc., Cleveland, Ohio, died at his home in Lakewood, a suburb of Cleveland, on July 16. Born in Canton, Ohio on May 5, 1889, Mr. Heintz entered the tire repair equipment manufacturing field in 1918 when he formed the company which bears his name. Today, the firm is world-known for its retreading molds, sectional molds, tube plates, tread roller, and tire driers. An ardent amateur photographer and boater, Mr. Heintz served two terms as Commodore of the Cleveland Yacht Club. Mr. Heintz is survived by his son, James C. Heintz, Jr., who has been named president of the company.

William J. McCauley

William J. McCauley, president and director of H. Muehlstein & Co., Inc., died on July 22 in New York Hospital after an illness of three weeks. He was 54 years old. Born in New York City, Mr. McCauley joined H. Muehlstein in 1917 and shortly thereafter became the manager of the company's Crude Rubber Division. He was elected a director in 1922, and in 1931 was elected secretary. Mr. McCauley was

elected vice-president in 1942 and president in 1944. He was also a director of H. Muehlstein & Co. (London), Ltd., and director and treasurer of H. Muehlstein & Co. (Canada), Ltd.

During World War II, Mr. McCauley served as administrative assistant in charge of the scrap rubber program of the Rubber Reserve Division of the Reconstruction Finance Corporation. After the war, he served as a director of the Rubber Distribution Corp., a government agency charged with the responsibility of liquidating and distributing surplus natural rubber stocks then owned by the government.

Mr. McCauley enjoyed wide national and international acquaintanceship in the crude rubber business having been active in the trade during his entire business career. He was a director of the National Association of Waste Material Dealers and a past-president of the Scrap Rubber Institute. He was a member of the Seawane Harbor Club in Hewlett, L. I. and the New York Athletic Club. Surviving are his wife, three sons and three daughters.

George M. Jenkins

George M. Jenkins, manager of truck tire sales for the Firestone Tire & Rubber Co., died on June 29 at Peoples Hospital in Akron, Ohio. He was 55 years old. A 27-year veteran at Firestone, Mr. Jenkins was employed in 1925 as an instructor in the Service School in Akron. He successively held positions as service manager in Kansas City and Chicago, general line salesman, assistant district manager, store manager and store supervisor in Chicago. Mr. Jenkins was active in Akron Masonic bodies. Services were held on July 2 at the Billow Chapel in Akron with interment in Louisville, Ky. He leaves his wife.

Thomas Cruthers

Thomas Cruthers, vice-president of the Worthington Corp., Harrison, N. J., since 1936, died at his home in West Orange, N. J. on July 27. Mr. Cruthers, who graduated from the Stevens Institute of Technology, joined the Worthington organization in 1907 in charge of the Gas Engine Field Erection Department. From 1925 to 1929 he held successive positions of sales engineer, assistant sales manager and sales manager in the New York office. From 1930 to 1932, he served as assistant general sales manager and from 1932 to 1936 was assistant vice-president in the General Sales Department. Mr. Cruthers was a member of the board of governors of the National Electrical Manufacturers Association, a director of the N. J. State Chamber of Commerce, and a member of the Society of Naval Architects and Marine Engineers, American Society of Refrigeration Engineers, National Association of Manufacturers and the Heat Exchange Institute. He was also a member of the N. Y. Railroad Club, the Traffic Club of New York, the Montclair Golf Club and the Essex Club of Newark.

Daniel R. Hanawalt

Daniel R. Hanawalt, founder of the India Tire & Rubber Co. of Mogadore, Ohio, and for many years representative of the Eastern Tale Co., died at his home in Akron on June 16 after an illness of two months. He was 91 years old. Born in Mifflin County, Penna., Mr. Hanawalt also conducted his own business as sales representative for metal working and wood working machinery manufacturers. Services were held in Akron on June 18 with interment at Spring Run Church, McVeytown, Penna. His wife, two sons and a daughter survive.

Monsanto Renames Vinyl Chlorides

Monsanto Chemical Co. has given a new trade mark to resins and compounds of the vinyl chloride family. As of July 1, they became known as "Opalon." David S. Plumb, sales manager of the Vinyl Resins Department in the company's Plastics Division at Springfield, Mass., pointed out that all vinyl chlorides produced by the company were formerly classified as "Ultron." He said that the new designation would simplify material specification and would conform to the plastics industry's trend to more specific and more simplified terminology. Vinyl chloride film and sheeting will still be referred to as "Ultron," Mr. Plumb said.

Opens Polyvinyl Alcohol Plant

Colton Chemical Co., Cleveland, Ohio, has announced the opening of its new plant for the production of polyvinyl alcohol. The company is now offering the material in two standard grades: "Vinol FH-400," a medium gray fully hydrolyzed type, and "Vinol FH-500," a high-viscosity fully hydrolyzed type. Colton also produces "Vinac" polyvinyl acetate emulsions, polyvinyl acetate dry beads and phenol formaldehyde solutions.

Marine "Fender" for New Liner

To protect both the ship and the pier and to aid in docking the 53,300-ton high speed superliner United States, a new type marine fender has been constructed on Pier 86, North River in New York City. The fender was designed and built by the George W. Rogers Construction Co. working with the Goodyear Tire and Rubber Co. It is expected that the new fender will be able to absorb the impact of the ship, thus preventing damage to either her hull or to the pier. Built at the northwest corner of the pier, the fender consists of two concentric arcs of piles, sunk deep in the river bottom with the space between them taken up with special rubber cylindrical dock fenders. There are 22 piles in the outer ring and 21 in the inner ring

attached to the pier. These piling arcs, together with the huge rubber cylinders make up the entire fender which provides a high degree of resiliency and 27 inches of compression space to absorb the shock. Goodyear described the rubber tubing used in the fender as "a high tensile compound." Ten vertical tubes, each 12 inches in outer diameter, hang along the inner arc of the piles. Outside these are superimposed four 26-foot rubber cylinders, each 15 inches in diameter. Four horizontal wooden wales are fastened to the inside of the outer piling arc and are covered with vertical oak sheeting. It is this sheeting that makes contact with the horizontal rubber cylinders when pressure is exerted on the outer piles. The photograph shows two vertical and the top horizontal rubber cylinder of the fender.

Goodrich Chemical Enlarges Staff

B. F. Goodrich Chemical Co. has enlarged its field sales staff for Hycar rubber. P. C. Cramer has been named to service the immediate Philadelphia area, as well as Delaware, Virginia, and eastern West Virginia. T. C. Culver will now be responsible for Hycar rubber sales in the southeastern states with permanent headquarters in Clemson, S. C. Frank E. Bell, Jr. will cover eastern Indiana and Michigan, Ohio, and western New York and Pennsylvania. Hycar sales in the immediate Cleveland and Pittsburgh areas will be handled by G. A. Daum.

George E. Hall, Sr.

George E. Hall, Sr., for the past 10 years associated with the Anderson Rubber Co. of Akron, Ohio, and formerly secretary-treasurer of the old Western Reserve Rubber Co., died on July 8 in City Hospital in Akron. He was 75 years old. Well-known in the rubber industry, Mr. Hall was a pioneer in the toy balloon field. Services were held on July 10 in Akron, with interment in Rose Hill Cemetery. Mr. Hall is survived by his wife, two sons and a daughter.

Henry F. Kleinfeldt

Henry F. Kleinfeldt, vice-president of the Abbe Engineering Co., New York, N. Y., died on June 6. He had been in failing health for the past two years. Mr. Kleinfeldt had been with the Abbe organization for more than 40 years, and was active in the development of many mixing, pulverizing and blending process operations which are standard practice in industry today. He is survived by his wife and two sons.

Luther E. Coleman

Luther E. Coleman, vice-president in charge of sales for A. G. Spalding and Bros., Inc., for 40 years, died on August 3 in Presbyterian Hospital at New York City. He was 63 years old and had been in failing health for the past several years. Mr. Coleman had played baseball and football as an undergraduate at Central College in Fayette, Mo., during his undergraduate days. He is survived by his wife and daughter.

Chemigum Latex 235BHS and 245CHS

Production of two new latices of special interest to paper and textile converters and other chemical processors has been announced by the Chemical Division of the Goodyear Tire & Rubber Co. The new products are designated as Chemigum Latex 235BHS and Chemigum Latex 245CHS. The new 235BHS adds a high solids, minimum stabilized latex to the 235 series of butadiene-acrylonitrile copolymers. The new 245CHS adds a high solids, anionic stabilized copolymer to the 245 series. According to the company, requirements of paper and textile converters can now be met with a Chemigum latex tailored for their particular needs because of the availability of three different stabilization systems, ammonia soap, synthetic anionic, and minimum stabilization in both medium and high acrylonitrile content latices. Favorable reception of the anionic stabilized high acrylonitrile latex 235CHS by those interested in a high acid salt tolerance was responsible for introduction of 245CHS to expand sales in this field with a medium nitrile-content latex. Butadiene-acrylonitrile latices are used in the compounding of adhesives, plasticization and modification of vinyl, rubber and resinous latices, modification of asphalt emulsions, and formulation of specialty coatings as well as for coating and impregnating paper, fabric and leather.

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A solid, friable resin, effective in highly-loaded GR-S and natural rubber stocks, suitable for white stocks.

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Laboratory-tested and factory-proved, this new resin shows remarkable properties where it counts most—in the factory and in competitive compounds.

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These are typical of factory runs with POLYMEL C-130. In addition, its low melting point of 210°F makes it an excellent plasticizing-processing resin for short cycle batches.

POLYMEL C-130 is low priced and readily available. If you haven't done so yet, send for your sample today, or, better yet, ask for a sample and order enough for a trial run in your plant. You'll be gratified with the results.

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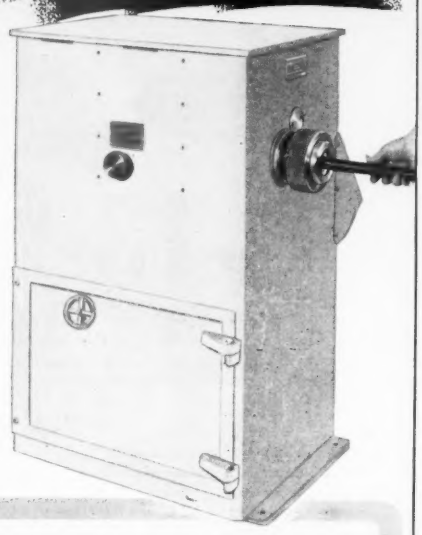

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For low cost, high speed, volume production --you should have the new Holmes Rotary Stock Cutter in your plant. Cuts up to 36,000 pieces per hour. Handles stock up to 3" in diameter...and...cuts pieces up to 3" in length. Low in cost--will quickly pay for itself.

WRITE OR WIRE FOR SPECIFIC DETAILS--regardless of your particular requirements. With 51 years know-how specializing in machinery and molds for the rubber industry--Holmes can help you solve your problems, too, as they have for so many others. No obligation, of course.

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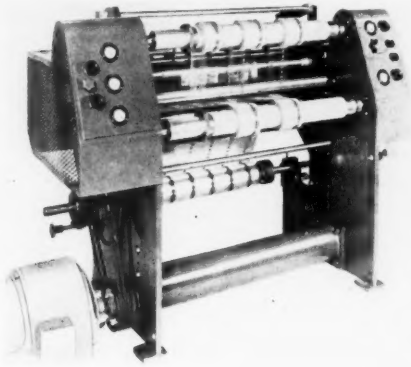
NEW EQUIPMENT

Model 585 Slitter-Rewinder

Based on an entirely new design, the Model 585 Plastic Film Slitter and Rewinder manufactured by the John Dusenberry Co., Inc., 271 Grove Avenue, Verona, N. J., is particularly useful in slitting plastic film, foil and pressure-sensitive tape. The unit will handle rolls of 32, 42, 52 and 62 inch width and has a rewind diameter



capacity of 12 inches. Core diameters are 1 and 3 inches while minimum slit width is $\frac{3}{8}$ inch. Speeds, depending on the static created, are up to 500 fpm.

The unit is so constructed that a standard razor blade runs in the groove in the slitting roll. The grooves are $\frac{1}{8}$ inch apart. The razor blade holders are mounted on a common shaft which is raised and lowered by means of a worm and worm wheel in and out of engagement with the slitting roll. Raising or lowering the knife shaft can be done from the front or rear of the machine.

The male knife is 3 inches in diameter,—.019 inch thick, ground to a 15° included angle with a sharp edge. This knife is mounted on a clamp type holder and runs in a groove in the 4-inch diameter slitting roll. The slitting roll is driven by the machine and in turn drives the knife shaft carrying the 3-inch O.D. male knives. The rewind clutches are independent of each other and are air-operated by means of a diaphragm type air cylinder. Each cylinder is controlled by a precision pressure regulator with a gauge registering the air pressure on the clutch. This feature enables the operator to preset tension for different materials and, if necessary, to increase or decrease the tension as the roll builds up.

The mandrels are built on the differential winding principle. Cores and spacers alternate on each mandrel. The spacers are restrained from rotating by means of a key while still free to slide axially. When an adjustable pressure is exerted axially on the mandrel each core spacer surface acts as a small slip clutch allowing individual rolls to compensate for out of caliper conditions.

The rewind mandrels are held in the machine by air operated mandrel locks. These mandrel locks are so designed that all end play and shake are removed from the mandrel. To remove the mandrels from the machine separate push-pull valves are operated reversing the

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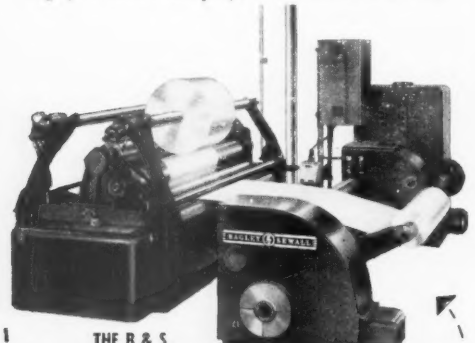
"The engineering of this new unit indicates a fine understanding of the problems of the users of this type of equipment. The Backstand is much easier to handle as there are no shafts. It is also much easier and faster to make changes on it. I believe that changing rolls with this Backstand can be brought down to well under one half minute."

You may purchase the B & S Shaftless Backstand with or without the new B & S Slitter and Rewinder. The Backstand may be used on any type of rewinding equipment, as well as on waxing and laminating machinery, printing presses, etc.

For full details on the Shaftless Backstand and the new B & S Slitters and Rewinders, write to The Bagley & Sewall Company, Watertown, New York.



THE B & S
#55 SHAFTLESS BACKSTAND
features automatic tension and side register control; motor for raising and lowering mill roll arms, also motor for moving the arms to accommodate different width rolls. Entire working mechanism is totally enclosed.

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cylinders applying air to the mandrel locks, thus allowing the mandrels to be removed.

The mill roll or parent roll brake is air-operated from the front of the machine by means of a regulator and gauge. A quick disconnect enables the operator to remove the mill roll from the mill roll shaft bearings. Precision lateral and radial adjustments are incorporated in the machine for lining up the axis of the mill roll with the slitting roll. This roll is located at the rear of the machine and is used to straighten out the web as it leaves the mill roll. It removes loose edges and soft sides and enables the web to travel straight and flat into the machine.

Staticator Static Control Unit

Of particular use in the rubber industry, the "Staticator," produced by the John Hewson Co., 106 Water Street, New York 5, N. Y., is valuable in the control of static in calendering, coating and spreading operations. The unit automatically gives audible and visual warning whenever static charges build up to a hazardous

level. It detects the sources of static generation, measures the intensity of the charge and determines the polarity of the charge. This explosion-proof instrument will detect static charges of any intensity.

The case of the Staticator is of cast aluminum, 6½ by 6½ inches and 6 inches deep. A carrying handle cast integrally with the body makes for easy portability of the 14 pound unit. An extremely sensitive detector probe 24 inches long with a head 3½ inches in diameter picks up static charges as low as 50 volts. Sensitivity control is provided by a 500,000 ohm potentiometer. The unit is provided with standard sensitive earphones for use in noisy industrial areas.

A TV two conductor insulated cable is used for permanent warning installations and is installed in the area to be protected. This antenna, when used with the Staticator, detects and warns of hazardous static in any part of the protected area. A central control panel consisting of both warning lights and a buzzer signal is installed in a central control office. Separate lights are used when more than one area has static protection and each light signals a warning of dangerous static in each protected area.

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Polymeric Plasticizer

- LOW VOLATILITY
- EXCELLENT "HAND"
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A small army of ever-active destructive forces works constantly to shorten the life of plastic garden equipment the moment it goes into use. The scorching rays of the sun . . . the cutting abrasion of dirt . . . the drying effect of heat . . . the constant flexing of normal use . . . the punishing blasts of winter . . . the continual extraction by water—all contribute to gradual deterioration. In just such applications, Plastolein 9720 proves its superiority in so many ways. It gives you extremely low volatility, outstanding low-temperature flex, excellent heat and light stability, extreme resistance to hot and cold water and oil extraction, and excellent "hand." *Where durability counts* . . . be sure to specify Plastolein 9720 Polymeric which offers outstanding resistance to the normal ravages of time and use.

New $2,000,000 Ozone-Oxidation Plant to make more and purer Azelaic and Pelargonic Acids

Emery's new plant, now under construction, will add considerably to the present volume of Plastolein Plasticizers derived from Azelaic and Pelargonic Acids. Furthermore, new ozone-oxidation process will reduce costs substantially!

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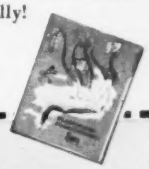

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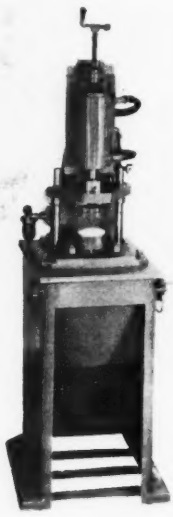
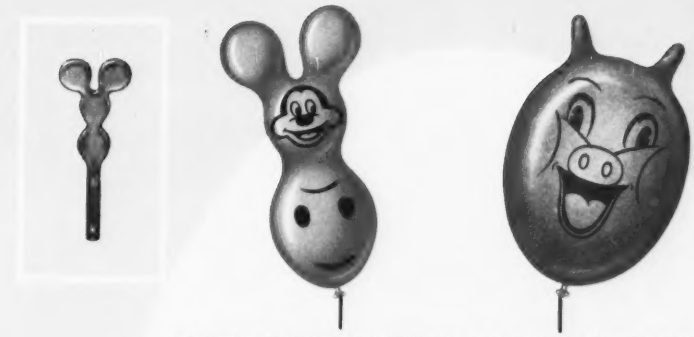
Safety Air Controlled Press

Finding use in die cutting, etc., the new Safety Air Press manufactured by the Houchin Machinery Co., Inc., Hawthorne, N. J., provides new standards for safety in operation. The operator must use both hands at the



same time to operate the easy air controls. The dual-control levers, one at each side of the press, must be held down simultaneously or the ram will not function. Important too, is the fact that the operator can be seated at the machine for there is nothing for his feet to do. Pressures are quickly adjustable up to 2,500 pounds of surface pressure.



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Pie-Flex Portable Mixer

The development of a new type of portable mixer of extraordinary lightness and portability has been announced by Process Industries Engineers, Inc., Pittsburgh, Penna. "Pie-Flex," as the new mixer is called, is designed with separate motor coupled to the propeller shaft by a flexible drive shaft especially designed for

agitator service. Mixer, drive shaft, and motor are quickly and easily detached for carrying separately.

Removal of the motor from its customary place at the top end of the propeller shaft, besides reducing the weight by more than half, results in a mixer of simplified design, streamlined and perfectly balanced. Relieved of its topheavy burden, the mixer is much easier to handle, mount in place and adjust to the desired angle. Adjustment of the angle is facilitated by a lever-operated positioning device by which the mixer can be quickly positioned and locked in place without tools.

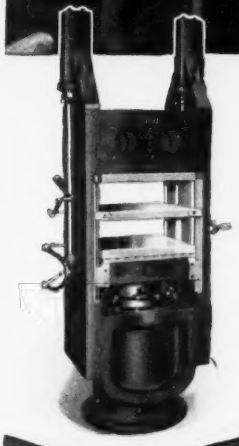
The propeller shaft is supported by two widely-spaced ball bearings in a bright-finished cast aluminum alloy body. Wide spacing of bearings insures smoother running. No special motor is required—any standard horizontal motor can be used. Thus motors on hand can be utilized. The motor, being coupled to the mixer by a flexible drive shaft of any desired length within practicable limits, can be mounted at any place to suit the requirements of the mixing job. For instance, in the case of hazardous operations, the motor can be mounted out of reach of inflammable or explosive vapors. If necessary, the motor can be mounted in the adjoining room by running the flexible drive shaft through the wall.

A new line of **general-purpose diaphragm valves** said to be ideal for handling a wide variety of corrosive chemicals are being manufactured by the American Hard Rubber Co., 93 Worth St., New York, N. Y. The valve body is molded of Ace Parian, a plastic compound in the polyethylene family, while the diaphragm itself may be of neoprene, some other rubber, or polyethylene, as required.

An accurate, highly versatile **compression tester** is now available from the Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Penna. The unit makes flexure tests of plastics, glass, ceramics, insulation board, plywood, etc., as well as for "flat crush" and "column compression" tests of paper.

Batch Samples as large as 1600 ml can be ultracentrifuged up to 20,000 rpm under controlled temperature conditions in a new **bowl-type rotor** designed for use with the Spinco Model L Preparative Ultracentrifuge manufactured by the Specialized Instruments Corp., 637 O'Neill Ave., Belmont, Calif.

300 TON ERIE Hydraulic Presses



Versatility in Rubber Molding

IN one of the Rubber Industry's largest plants, these 10 Erie 300 Ton Hydraulic Presses are molding a multitude of rubber products. Each Erie press shown here has four 3 ton pushback cylinders. Main rams are ground from chilled iron. Pushdown rams are of stainless steel. All glands and guides are bronze. Each press has two 6 inch openings and 24 inch by 24 inch platens. Nearly a half-century of engineering "know how" in designing Erie Foundry Company hydraulic presses is matched by unexcelled craftsmanship in producing this equipment for the rubber and plastics industry. Let Erie Foundry Company Engineers consult with you on your hydraulic press problems. Bulletin 350 gives full details on Erie Foundry Company Hydraulic Presses. Write for it.

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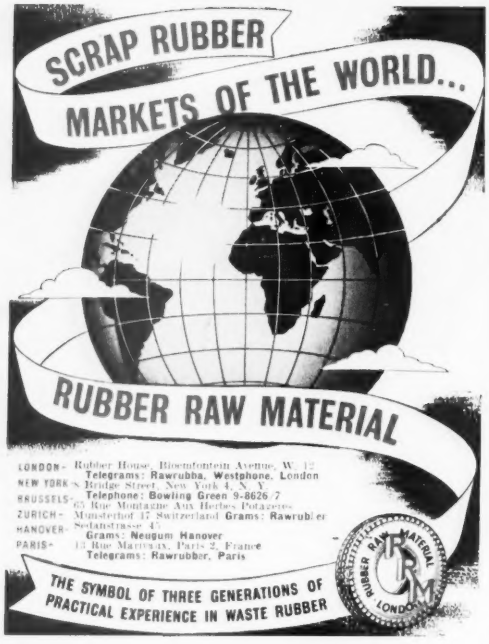
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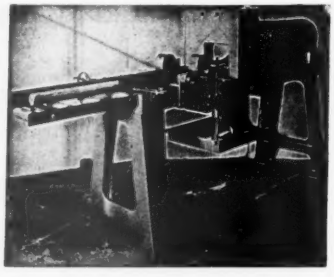

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REVIEWS

BOOKS

Hevea: Thirty Years of Research in the Far East. By M. J. Dijkman. (With a Foreword by R. D. Rands). Published by University of Miami Press, Coral Gables, Florida. 8½ x 11 in. 330 pp. $6.00.

Ever since Sir Henry Wickham brought Hevea rubber seeds to England from Brazil, which eventually led to the development of the plantation rubber industry in the Far East, the literature devoted to the cultivation of rubber has mounted steadily. Both the British and Dutch governments heartily endorsed the distribution of technical booklets and manuals devoted to the subject, especially where native producers were involved. Unfortunately, however, this literature is widely scattered and preponderantly in the Dutch language. Accordingly, this book, which summarizes the 30 years of Dutch East Indian rubber research up to its sudden stoppage in 1941 by the Japanese occupation, is a most welcome addition to the technical literature on rubber, particularly in view of the current effort to cultivate rubber in the Western Hemisphere.

As Dr. Rands points out in his foreword to the book, the work is much more than an accurate chronological summary of the literature in the 30-year period referred to above. It presents critical interpretations of the research results classified under the usual major topics, which facilitates their adaptation to Western Hemisphere conditions, making them more useful than the instructions contained in the British rubber planting manuals, practically all of which are intended for their own special conditions. For example, considerable data on leaf blight is presented, this disease being one of the greatest problems faced by producers of natural rubber in the Western Hemisphere. The scope of the book can be realized from the fact that there are 116 illustrations and 93 tables.

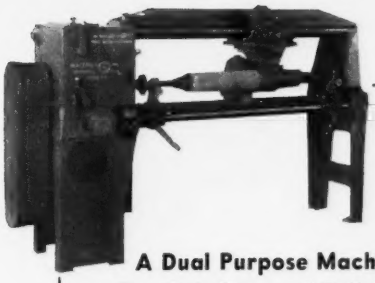
The book has seventeen chapters, as follows: (1) Introduction; (2) Historical; (3) Hevea as a Factor in the Economic Development of the East Indies; (4) Development of Rubber Research in Indonesia; (5) Fertilizing and Soil Management; (6) Planting Material; (7) Growth; (8) Tap and Tapping Systems; (9) Mechanism of Production and Related Phenomena; (10) Growth, Yield and Disease in Relation to Planting Density; (11) Diseases and Pests; (12) Outline of Vegetative Selection; (13) Outline of Generative Selection; (14) Results of Mother-tree Selection; (15) Experimental Results with Vegetative and Generative Selection; (16) Clones and Selected Seedlings Under Commercial Conditions; (17) Ecology and Rubber Improvement. Both author and subject indexes are included, as well as an extensive appendix.

Dr. Dijkman, the author, is well qualified to have undertaken the task of preparing this important work. He has been closely identified with the agricultural problems of the Far East since being graduated from the University of Utrecht in 1934 with a Ph.D. in plant physiology. He has been associated with the University of Miami since 1947.

•

Boiler Feed Water Treatment. (3rd Edition). By F. J. Matthews. Printed in Great Britain. Distributed by the Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. 5½ x 8½ in. 208 pp. $4.50.

Designed to provide the operator of an average plant with some guidance to the wide variety of boiler feed water treatments currently available, the latest edition of this handy guide book has been completely revised, and rewritten where necessary, to cover latest developments. New material has been added on silicate scale, hydrogen and demineralizing zeolites, colloidal conditioning, and prevention of turbine deposits. Considerable space is devoted to water analysis and testing methods. A subject index is included.



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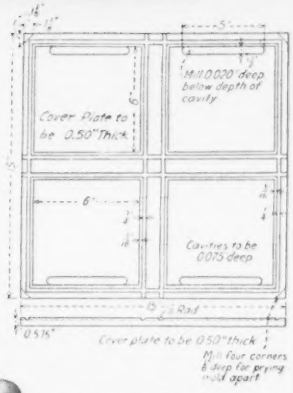
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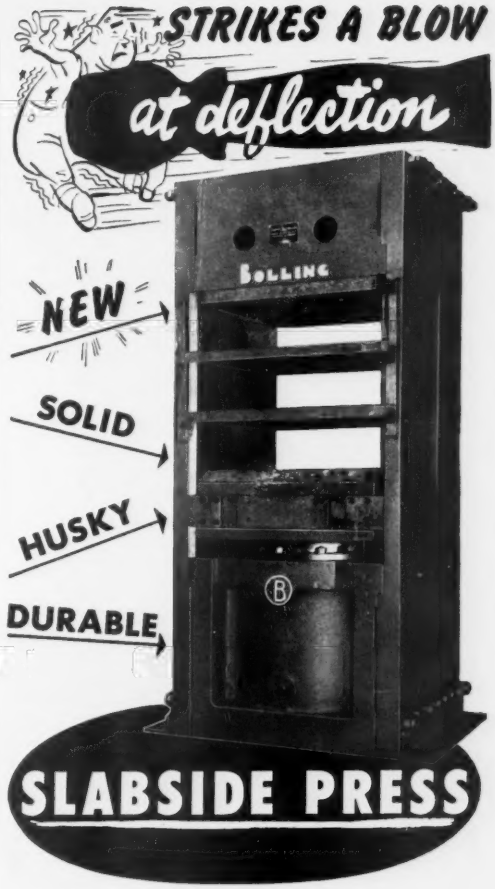

–A 48" x 48", 1000-TON, SLABSIDE PRESS

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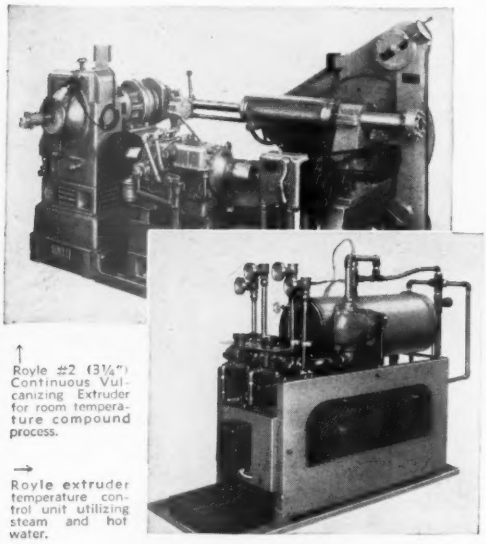
To the Wire Insulating Industry

The room temperature compound process and associated equipment recently developed by the Western Electric Company, Incorporated, offer nine important advantages. These advantages begin with the storage of completely mixed, ready-to-extrude, rubber, GR-S, or Neoprene compounds and extend to a smoother and improved appearance for the finished product.

The complete extruder vulcanizing portion of the room temperature compound process is available to insulated wire producers* from John Royle and Sons who, for seventy-two years, have been building extruding machines to meet the most exacting process requirements.



↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.

→ Royle extruder temperature control unit utilizing steam and hot water.

CHECK THESE ADVANTAGES:

- Improved diameter control
- Reduction in compound scrap
- Reduction in electrical faults
- Permits storage of completely mixed compounds
- Permits more economical scheduling of mixing equipment
- Eliminates "warm-up" operation
- Possible mill-room economies
- "Hot" machines may be converted
- Finished product has smoother finish—better appearance

Licensees of Western Electric Company

JOHN ROYLE & SONS
10 ESSEX STREET, PATERSON 3, NEW JERSEY

Techniques of Plant Maintenance: 1952. Published by Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y. 8¼ x 11 in. 182 pp. $6.

Texts of all papers read at the various panels which featured the 1952 Plant Maintenance Conference and Show are included in this book, a highlite of which is the inclusion of the text of 717 questions propounded by engineers from every major industry who attended the sessions. General topics include costs, inspection methods and records, planning and scheduling maintenance work, and lubrication. There are chapters on maintenance of electrical equipment, plant buildings, the training of maintenance workers and supervisors, and project preparation and cost control. Separate treatment of maintenance problems, according to size of plant, is given in five chapters. Chemical, steel and automotive plants are covered in separate chapters. In short, the book represents a comprehensive discussion of plant maintenance problems.

•

Technical Reporting. By Joseph N. Ulman, Jr. Published by Henry Holt & Co., 383 Madison Ave., New York 17, N. Y. 6½ x 9¼ in. 289 pp. $4.75.

How to convey information and ideas accurately and efficiently, using the techniques perfected by modern industry and science, is told and shown in this practical handbook. Special attention is paid to the principles, some of them quite elementary, that seem to the author to be most overlooked by technical writers. These subjects were selected by the author on the basis of many engineering reports and scientific papers that he has read or edited both in industry and at the Massachusetts Institute of Technology, where he is Assistant Professor of English. The book is divided into three parts, the first covering basic issues, the second devoted to the reports themselves, and the third to tools and methods. There are 16 chapters in all and an appendix. A subject index is included.

BOOKLETS, CATALOGS, etc.

The Consulting Chemist and Chemical Engineer in a World Economy. Association of Consulting Chemists and Chemical Engineers, Inc., 50 East 41st St., New York 17, N. Y. 8½ x 11 in. 32 pp. $1.00.

The origin and growing need of consulting services rendered by independent professional consultants can be traced to the increasing demand on industry for new inventions, technical perfection and better consumer goods. This booklet attempts to explain the place of the professional consultant in industry. An effort has been made to draw a blueprint of the essential requirements for compatible and constructive relations between client and consultant. The booklet emphasizes that the consultant is a specialist, and enumerates the services he offers to industry. It also presents a number of interesting case histories in which the services of a consultant proved to be extremely valuable.

•

The Work Cars Do. Automobile Manufacturers Association, New Center Building, Detroit, Mich. 5½ x 8½ in. 32 pp.

What part does the motor car and truck play in our lives today? Is it an essential or a luxury? The answers to these questions are very important if correct decisions are to be made in our combined defense and civilian economy. To help this situation the automotive industry had a survey made which included four thousand interviews and produced 20,000 statistics. From the tabulations have emerged an interesting and factual report which indicates that cars and trucks are playing a tremendously important part in the nation's combined defense and civilian economy.

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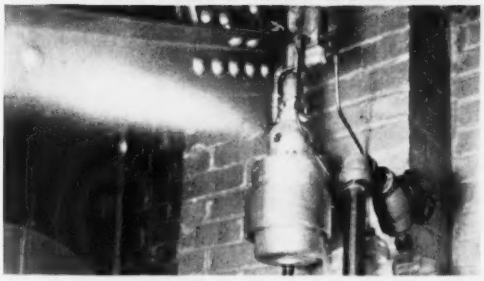

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PERICLES

Prophetic words indeed by Master William Shakespeare. Even though they have been lifted from their context to suit our purpose, they do apply most aptly to the duties required of modern motor tyres. In keeping with our policy, we have very close liaison with tyre factories and engineers throughout the world, and in consequence we are abreast of all the latest developments.

Illustrated below is one of our machines for tyre production—the McNeil Twin Tyre Press, which we manufacture and sell under license.

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Scrap Rubber

•

Natural Rubber

•

Plastic Scrap

Representatives for:

S. J. PIKE & CO., INC.
Crude Rubber Importers
30 Church Street
New York 7, New York

REVIEWS (CONT'D)

Thermocouples: Assemblies Parts and Accessories. (Catalog No. EN-S2). Leeds & Northrup Co., 4907 Stenton Avenue, Philadelphia 44, Penna. 7¾ x 10½ in. 48 pp.

The company's complete line of standard thermocouple assemblies and parts is presented in this newly-revised and illustrated catalog. The catalog not only offers the latest information on available couples and couple assemblies for general applications, but also includes an expanded section on special couples for plant and laboratory. In a simplified tabular arrangement, the publication lists the accuracy limits of couples, the temperature and physical limitations of thermocouple and protecting tube materials, and the recommended protecting tube and well materials for general applications. The expanded section on special couples includes those for each application. Component parts of couple assemblies—heads, tubes, elements, insulators, etc.—are fully described and illustrated. The catalog itself has a handy margin-index to facilitate finding specific sections.

•

Wheelco Data Book and Catalog. (Bulletin No. TC-9). Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill. 8½ x 11 in. 42 pp.

This 1952 edition of the Wheelco Data Book and Catalog contains up-to-date prices, application recommendations and pertinent information concerning instrument sensing units and associated accessories produced by the company. Among the many special items listed are resistance bulbs and wells, radiation detectors, special thermocouples for plastic injection and extrusion machines, and a molten metal thermocouple for ferrous metals. Essential data pertaining to making, checking, selecting and ordering thermocouples, wire sizes and resistances, and temperature-millivolt curves make this manual a valuable asset in applying indicating, controlling and recording instruments.

•

Neolyn Resins. Synthetics Dept., Hercules Powder Co., Wilmington 99, Del. 8½ x 11 in. 16 pp.

This technical booklet contains practical application data and starting formulations for the use of Neolyn resins in adhesives, plastics, lacquers, and organosols. Neolyn resins are described as rosin-derived alkyd-type materials ranging from soft balsamic resins to solid products having a softening range around 88° C. Data about two new resins, Neolyn 35 and 43, are also presented in the booklet. Technical information about the general properties of Neolyns and also the specific properties of each of the seven resins in this series, and performance characteristics, are included.

Neat Trick?

SEE PAGE 574

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good workmanship

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Akron 9, Ohio

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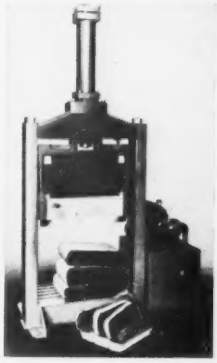

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REVIEWS (CONT'D)

Plastolein Plasticizers. Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio. 8½ x 11 in. 24 pp.

This booklet features the complete line of Emery Plastolein plasticizers. In addition to specifications and properties for Plastolein 9050 DHZ (di-2-ethylbutyl azelate), 9053 DOZ (di-2-ethylhexyl azelate), 9055 DGP (diethylene glycol dipelargonate), 9250 THFO (tetrahydrofurfuryl oleate), 9715 Polymeric, and 9720 Polymeric, it contains considerable useful information on testing of plasticizers including ultra-violet stability and heat stability. Test methods and stabilizer data are also included.

•

Mildewproofing Agents. (Report No. P-17A). Witco Chemical Co., 295 Madison Avenue, New York 17, N. Y. 8½ x 11 in. 27 pp.

This newly-revised and expanded report covers mildewproofing agents with respect to government specifications calling for mildewproofing of canvas, cotton duck, burlap, rope, net, webbing, cord, belting, thread, twine and felt. Also included are descriptions of the methods used in mildewproofing and the products, such as 8% copper naphthenate, used. Finally, there is an index of the specifications abstracted so any particular specifications can be easily located.

•

The Intermix. Francis Shaw & Co., Ltd., Corbett St., Ashton New Road, Manchester 11, England. 7 x 10 in. 20 pp.

This handsome brochure describes and illustrates many of the design features of the Intermix, the heavy-duty external mixer which finds extensive use in the rubber industry. The manner in which the unit operates is completely outlined while its many unique features are elaborated upon. The brochure also considers the matter of installation and servicing. Also provided is a full description of sizes.

•

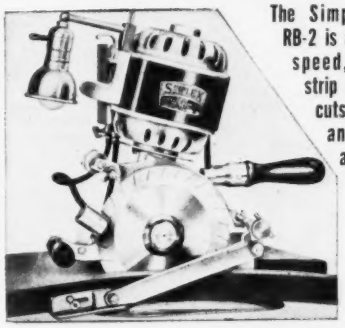
Pittsburgh PX Plasticizers. Plasticizer Division, Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Penna. 8½ x 11 in. 16 pp.

This illustrated booklet describes the company's complete line of plasticizers. It is divided into three main parts: "Plastics . . . an Industry Comes of Age," "The Story of Pittsburgh PX Plasticizers," and a special section on the uses and properties of ten individual plasticizers offered by the company. A complete list of company products is given on the inside back cover.

Neat Trick?
SEE PAGE 574

SIMPLEX
REG. TRADE MARK

CUT 2500 FEET OF STRIP PER HOUR



The Simplex Model RB-2 is a new high-speed, portable strip cutter that cuts efficiently and accurately.

The new Model RB-2 has a maximum cutting thickness of two inches, weighs 44.5 pounds, and is available in both A.C. and D.C. types. Manually operated, the machine is capable of cutting up to 20,000 feet of rubber strip in eight hours. A series of slits in the edge of the cutting blade carries water from a reservoir into the cut and not just to the top of the rubber being cut. This method lubricates the entire cut and produces a straight and even edge.

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- Triethylene Glycol Dicaprylate—(TG-8)
- Di-iso-octyl Phthalate—(DIOP)
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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, AUG. 6, 1952

Natural Rubber

Since our last report (July 8), the price of spot rubber on the New York Commodity Exchange has fluctuated in a narrow range of 1c, high for the period being 30.75c reached on July 16, and low being 29.75c reached on August 1, 4 and again on August 5. The average price of spot rubber for the month of July was 30.52c based on 22 trading days.

Reports from Ceylon state that the Ceylonese government may ask the United States to buy 100,000 tons of rubber annually at market price so that exports to Russian satellites can be stopped. This figure represents almost the entire Ceylon output of rubber. So far this year, Communist China has been Ceylon's best rubber customer.

Output of natural rubber in Brazil in the first four months of 1952 was 14,489 tons as against 12,410 tons in the like period of 1951. Production of washed and dried rubber in plants under contract to the Amazon Credit Bank amounted to 10,455 tons in the period January-April, 1952, down slightly from the 10,894 tons produced in January-April, 1951.

Today's quotations for the outside market, London and Singapore follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.30
August	.30
September	.29¼
Thin Latex Crepe:	
Spot	.39¼
August	.39¼
Thin Brown Crepe, No. 2	.23¼
Smoked Blankets	.23
Flat Bark Crepe	.18¼

London Market

(Standard Smoked Sheets)

September	30.33 - 30.62
October-December	29.75 - 30.04

Singapore Market

(Standard Smoked Sheets)

August	28.33 - 28.44

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM JULY 9 TO AUGUST 6

July	Spot	Sept.	Dec.	Mar.	May	Sales
9	30.00	29.45	27.60	26.50	25.75	70
10	30.00	29.45	27.70	26.65	26.00	103
11	30.25	29.85	28.00	27.00	26.40	30
12						
13						
14	30.00	29.60	27.85	26.80	26.20	31
15	31.00	30.70	28.75	27.80	27.25	53
16	30.75	30.30	28.50	27.80	27.25	72
17	30.25	30.10	28.40	27.50	26.90	62
18	30.25	29.82	28.30	27.35	26.75	37
19						
20						
21	30.50	30.30	28.80	27.90	27.30	40
22	30.00	29.60	28.10	27.05	26.50	49
23	30.00	29.60	28.10	27.20	26.65	25
24	30.75	30.60	28.75	27.85	27.30	64
25	30.00	29.75	28.20	27.30	26.75	30
26						
27						
28	30.25	30.00	28.40	27.55	27.05	10
29	30.50	30.30	28.75	27.90	27.40	15
30	30.25	29.85	28.39	27.55	27.05	29
31	30.00	29.75	28.20	27.20	26.75	26
Aug.						
1	29.75	29.70	28.15	27.15	26.70	21
2						
3						
4	29.75	29.65	28.15	27.15	26.70	6
5	29.75	29.75	28.20	27.20	26.80	14
6	30.00	30.40	28.80	27.80	27.36	69

Scrap Rubber

The low levels evidenced by the scrap rubber market during the past few months continue and, at this writing, it does not appear likely that any immediate improvement will take place in the next few months. The trade is still awaiting the suspension of OPS ceilings on scrap rubber. Meanwhile, however, prices on all grades of scrap are being considered as nominal. The prices below represent ceilings established by the Office of Price Stabilization.

(Prices Delivered Akron)

Mixed tires	ton	$26.00
Mixed beadless tires	ton	34.00
Light colored carcass	ton	130.00
Black carcass	ton	50.00
No. 1 peelings	ton	65.00
No. 2 peelings	ton	42.00
No. 3 peelings	ton	38.00
Buffings	ton	30.00
Truck and Bus S.A.G.	ton	28.00
Passenger S.A.G.	ton	28.00
Mixed S.A.G.	ton	26.00
Light colored tubes	lb.	.16
Natural rubber red tubes	lb.	.16
Natural rubber black tubes	lb.	.11½
Mixed natural rubber tubes	lb.	.10
Butyl rubber tubes	lb.	.057
GR-S rubber tubes	lb.	.02
Mixed synthetic tubes	lb.	.03

Reclaimed Rubber

Activities in the reclaimed rubber market during the past period have been dull, with many of the rubber plants shut down for annual vacations and the taking of inventories. Trade opinion holds that the next few months will disclose what effect, if any, the recent government removal of controls on rubber will have on the market. Preliminary consumption figures by the Department of Commerce have indicated that consumption so far this year is running considerably lower than last. OPS-established prices follow:

(Prices for All Areas Except Calif.)

Premium Grade Whole Tire	.10½
First Line Whole Tire	.10
Second Line Whole Tire	.09½
Third Line Whole Tire	.09½
Fourth Line Whole Tire	.08½
Black Carcass	.14½
No. 1 Light Colored Carcass	.20¾
No. 1 Select Peel	.11¾
No. 1 Peel	.10½
Butyl Tube Reclaim	.14½
S.P. Natural Rubber Black Tube	.21
Natural Rubber Black Tube	.20
Natural Rubber Red Tube	.24½
Natural Rubber Gray Tube	.24¼

Cotton Tire Fabrics

Trade sources believe that with the publication of the new cotton crop report, there may be some slight advance in cotton tire and chafer fabric prices. There has been reported a moderate quickening of activity in chafer fabrics with tire fabrics continuing at fairly nominal levels. Current prices for chafers and fabrics follow:

Standard, Peeler, 12/4/2	lb.	.85
Extra Staple, Peeler, 12/4/2	lb.	.91

Chafers

14.4 oz. (per square yard)	lb.	.84
9.25 oz. (per sq. yard)	lb.	.78½
11.65 oz. (per sq. yard)	lb.	.75
8.9 oz. (per sq. yard)	lb.	.80½

Cotton

The price of middling uplands on the New York Cotton Exchange has swung in a range of 2.05c since our last report (July 8), high for the period being 41.09c reached on August 4, and low being 39.85c reached on July 17. The average price of middling uplands for the month of July was 40.37c based on 22 trading days. This compares with an average of 41.31c in June.

The International Cotton Advisory Committee has estimated world production of cotton during the 1951-52 season at 34,800,000 bales. World consumption was figured at approximately 32,000,000 bales, which means, the committee said, that end-season stocks on August 1 were increased by about 2,500,000 over stocks a year ago.

Raw cotton handling, storage and warehousing services were suspended from price control on July 31 by OPS. The action was taken under Amendment 20 to GOR 14, and remains in force until controls on raw cotton are reimposed. During the 1951-52 cotton season, OPS said, less than 35% of the total storage capacity was in use at any one time. The agency said no significant change in this situation is expected during the coming season.

The director of the Foreign Trade Division of the National Cotton Council returning recently from a six-week survey of the cotton outlook in the Far and Middle East reported that Japan is expected to buy about 1,100,000 bales of U. S. cotton again next year. India, he said, is not likely to import more than 400,000 bales and some sources indicate buying may be as low as 100,00 bales. Despite a decline in acreage, cotton production in the Middle East is expected to total about the same as last year.

Quotations for middling uplands on the Exchange follow:

	July 8	Aug. 6		
	Close	High	Low	Close
Oct.	36.99	39.14	38.77	38.92
Dec.	36.75	38.89	38.52	38.65
Mar.	36.57	38.76	38.40	38.50

Synthetic Rubber

(Dry Types—Per Pound)

Butaprene NF	.465	- .475
Butaprene NL	.475	- .485
Butaprene NAA	.515	- .525
Butaprene NXM	.550	- .560
Chemigum 30N4NS	.500	- .510
Chemigum 50N4NS	.500	- .510
Chemigum N3	.580	- .590
G-E Silicone Rubber (compounded)	3.15	-4.00
G-E Silicone Gum (not compounded)		-4.48
GR-I	——	- .2075
GR-S	——	- .230
Hycar OR-15	.580	- .590
Hycar OR-25	.500	- .510
Hycar OS-10	.550	- .560
Neoprene Types CG and AC	——	- .500
Neoprene Type E	——	- .650
Neoprene Types FR and KNR	——	- .800
Neoprene Type GN	——	- .380
Neoprene Type GN-A	——	- .380
Neoprene Type RT	——	- .400
Neoprene Type S	——	- .380
Neoprene Type W	——	- .400
Paracril B	.500	- .510
Paracril BJ	.500	- .510
Paracril C	.580	- .590
Silastic (compounded)	2.35	-4.40
Thiokol Type A	——	- .470
Thiokol Type FA	——	- .640
Thiokol Type FA-1	——	- .950
Thiokol Type ST	——	-1.000

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George Steinbach
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CURRENT MARKET PRICES

Of Rubber Chemicals and Compounding Ingredients

AUGUST 6, 1952

Prices are, in general, f.o.b. works. Range of prices indicates grade or quantity variations.

Abbreviations: bbls., barrels; c.l., carlot; cyl., cylinder; dlvd., delivered; dms., drums; l.c.l., less than carlot; M.B., masterbatch; min., minimum; ref., refined; sap., saponified; sp., special; syn., synthetic; t.c., tank cars.

*For Export Only

The arrangement of this section closely follows the Chemical Section of the 1951-52 RUBBER RED BOOK. Readers are referred to the RUBBER RED BOOK for the correct classification of any material or brand name. Suppliers of every material are contacted for price information. However, only those materials are listed for which quotations have been furnished within the past six months. The quotations are not guaranteed and prospective purchasers should contact suppliers for information. Suppliers are requested to send current price information to the Market Editor, RUBBER AGE.

ACCELERATORS

A-1 (Thiocarbanilide)	lb.	.48	.55
A-32	lb.	.61	.68
A-77	lb.	.47	.60
A-100	lb.	.47	.60
Accelerator No. 8	lb.	—	1.01½
Accelerator—49	lb.	.49½	.50½
Accelerator—552	lb.	—	2.07
Accelerator—833	lb.	.61	.63
Accelerator—833	lb.	1.17	1.19
Altax	lb.	.43½	.45½
Ancap *	lb.	.34	.36
Ancalax *	lb.	.42	.44
Ancazate * BU (ET & ME)	lb.	—	1.00
Ancazide * ET	lb.	—	1.00
ME	lb.	—	1.10
Arazate	lb.	—	2.23½
Beutene	lb.	.61	.63
Bismate, Rodform	lb.	—	3.00
Butasan	lb.	—	1.03½
Butazate	lb.	—	1.03½
Butyl Eight	lb.	1.00	1.35
Captax	lb.	.35	.37
C-P-B	lb.	—	1.95
Cumate, Rodform	lb.	—	1.45
Dibenzo G-M-F	lb.	—	2.58½
Diorthotolylguanidine	lb.	.54	.55
Diphenylguanidine	lb.	.44½	.50½
DJ-Sixty	lb.	.46½	.53½
Ethasan	lb.	—	1.03½
Ethazate	lb.	—	1.03½
Ethex	lb.	—	1.00
Ethyl Thiurad	lb.	—	1.03½
Ethyl Tuex	lb.	—	1.03½
Ethylac	lb.	.91	.93
G-M-F	lb.	—	2.58
Good-rite Erie	lb.	.35	.37
Guantal	lb.	.55	.62
Harvex	lb.	.52	.57
Hepteen	lb.	.43½	.45½
Base	lb.	1.80	1.85
Iodate, Rodform	lb.	—	1.00
Merac	gal.	.75	.80
Mercaptobenzothiazole	lb.	.35	.37
Mercaptobenzothiazyl Disulfide	lb.	.43½	.45½
Mertax	lb.	.45½	.52½
Methasan	lb.	—	1.03½
Methazate	lb.	—	1.03½
Monex	lb.	—	1.13½
Mono Thiurad	lb.	—	1.13½
Mortex	lb.	.61	.63
2-MT	lb.	—	.77½
NA-22 (for neoprene)	lb.	—	1.50
O-X-A-F	lb.	.44½	.46½
Pentex	lb.	—	1.03½
Flour	lb.	—	.20½
Permalux (for neoprene)	lb.	—	2.17
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	2.07
R-2 Crystals	lb.	—	2.20
Rotax	lb.	.45½	.47½
RZ-50	lb.	—	1.00
SA-52	lb.	—	1.13½
SA-57	lb.	—	1.03½
SA-62	lb.	—	1.03½
SA-66	lb.	—	1.50
SA-67	lb.	—	1.03½
SA-77	lb.	—	1.03½
Safex	lb.	—	1.15
Santocure	lb.	.68	.75
Selazate	lb.	—	1.45
Selenac (Ethyl, Methyl)	lb.	—	1.50
Sensit-5	lb.	.75	1.05
SPDX-GH (tons)	lb.	.64	.69
GL	lb.	—	.95
Tellurac	lb.	—	1.45
Tepidone	lb.	—	.55
Tetrone A	lb.	—	1.91
Thiofide	lb.	.43½	.50½
S	lb.	.46½	.53½
Thionex	lb.	—	1.13½
Thiotax	lb.	.35	.42
Thiurad	lb.	—	1.13½
Thiuram E	lb.	—	1.03½
M	lb.	—	1.13½
Trimene	lb.	.56	.58
Base	lb.	1.03	1.06
Tuads, Ethyl	lb.	—	1.03½
Tuads, Methyl	lb.	—	1.13½
Tuex	lb.	—	1.13½
Ultex	lb.	1.00	1.05
Unads	lb.	—	1.10
Ureka Base	lb.	.66	.73
Vitasan Crystals	lb.	.48	.53
Vulcacure NB	lb.	—	.45
ZB	lb.	—	.85
ZE	lb.	—	.85
ZM	lb.	—	.85
Z-B-X	lb.	—	2.45
Zenite	lb.	.43½	.45½
A	lb.	.51½	.53½
Zenite Special	lb.	.44½	.46½
Zetax (uncoated)	lb.	.44½	.46½
Zimate, Butyl	lb.	—	1.03½
Zimate, Ethyl	lb.	—	1.03½
Zimate, Methyl	lb.	—	1.03½

ACTIVATORS

Blue Lead Sublimed (dlvd.)	lb.	.13¼	.14¼
Fish Oil, Hydrogenated, Fatty Acid			
Hydrofol Acid (dlvd.)	lb.	.11½	.15¼
Hyfac 430 (dlvd.)	lb.	.14	.15½
Neo-Fat H.F.O. (dlvd.)	lb.	.14¼	.13¾
Stearex Beads (dlvd.)	lb.	.12	.13¼
Lime, Hydrated			
Arrowhead	ton	—	20.65
Marblehead	ton	—	15.00
Sierra	ton	—	19.50
Litharge			
Eagle (dlvd.)	lb.	—	.1875
SB (dlvd.)	lb.	—	.1875
Magnesium Oxide, Heavy			
General Magnesite 500	lb.	.05	.06½
600	lb.	.06	.08
Michigan No. 15	lb.	.0550	.0600
Permanente	lb.	.05	.06½
Magnesium Oxide, Light			
Baker's (Neoprene Grade)	lb.	—	.31
General Magnesite (Neoprene Grade)	lb.	—	.30
General Magnesite No. 101	lb.	—	.19
General Magnesite Standard	lb.	—	.22
K & M (Neoprene Grade)	lb.	.30	.31
Maglite D	lb.	—	.25
M	lb.	—	.31
Marine's (Neoprene Grade) (l.c.l.)	lb.	—	.31
Michigan No. 30	lb.	—	.24
No. 40 Extra Light	lb.	—	.31
Witco Extra Light	lb.	.32	.35
Oleic Acid			
Emersol 210 (dlvd.)	lb.	.11¾	.14¾
L.C.P. Red Oil	lb.	.11¾	.14¾

ACTIVATORS (Cont'd)

Palm Oil Fatty Acid (c.l.)	lb.	.11½	.14½
Potassium Oleate (drums)	lb.	.45	.55
Red Lead			
Eagle	lb.	—	.1975
No. 2 RM (dlvd.)	lb.	—	.1975
Sodium Laurate, 75%	lb.	.64	.74
Sodium Oleate, 75%	lb.	.45	.55
Paste (drums)	lb.	—	.20
Sodium Stearate, 75%	lb.	.45	.55
USP Grade (drums)	lb.	—	.37
Stearic Acid, Single Pressed			
Emersol 110 (dlvd.)	lb.	.11½	.12¾
Groco 53	lb.	.11½	.12¾
Stearex B (dlvd.)	lb.	.15¾	.16¾
Stearic Acid, Double Pressed			
Groco 54	lb.	.12	.13¼
Stearic Acid, Other			
Neo-Fat 1-58	lb.	.1190	.1315
1-60	lb.	.1400	.1525
1-65	lb.	.1450	.1575
White Lead Basic Carbonate	lb.	.1770	.1870
White Lead Basic Sulfate	lb.	.1919	.2019
Zinc Laurate			
Laurex	lb.	.26	.27
Zinc Stearate	lb.	.37	.39
Aquazinc	lb.	.20	.35

Unclassified Activators

Actifat (dms.)	lb.	—	.18
Aktone	lb.	.22	.23
Barak	lb.	—	.62
Curade	lb.	.57	.59
D-B-A	lb.	—	1.95
Dibutylamine (dlvd.)	lb.	.53	.55¼
MODX	lb.	.295	.345
Polyac	lb.	—	1.65½
Ridacto (drums)	lb.	.25	.26
Snodette (dlvd.)	lb.	.16	.17¼
SOAC (min. 10 dms.)	cwt.	—	8.00
Vulklor	lb.	.75	.85

ANTI-COAGULANTS

Anhydrous Ammonia (l.c.l.)	lb.	.17	.21
Aqua Ammonia (dms.)	lb.	.031	.035
M.B.M. (l.c.l.)	lb.	—	.35

ANTI-FOAMING AGENTS

Aero Anti Foam H	lb.	—	.20
Regular	lb.	—	.12
D.C. Antifoam A	lb.	5.65	6.65
Antifoam A Emulsion	lb.	2.30	4.00
Defoamer A-25	lb.	—	3.00
Deltyl Prime	lb.	.70	.82
Defoamer 630	lb.	—	.12½
Kessco X-3 (dms.)	lb.	—	.47¼
Modicol A	lb.	.12	.15
B	lb.	.35	.40
RS-968	lb.	.38	.38½
Terpinol Prime No. 1	lb.	.39	.54

ANTI-OXIDANTS

Agebest 1293-22A	lb.	1.90	2.00
Agerite Alba	lb.	2.27½	2.37½
Gel	lb.	.62	.64
Hipar	lb.	.94	.96
H. P.	lb.	.69½	.71½
Powder	lb.	.50½	.52½
Resin	lb.	.67	.69
Resin D	lb.	.50½	.52½
Stalite	lb.	.50½	.52½
White	lb.	1.45	1.55
Akroflex C	lb.	.69½	.71½
F	lb.	.69½	.71½
Aminox	lb.	.50½	.52½
Antioxidant 2246	lb.	1.65	1.68
Antox	lb.	.50½	.52½
Aranox	lb.	—	3.25
Benzoquinone	lb.	1.50	1.75
Betanox Special	lb.	.72½	.74½
B-L-E	lb.	.50½	.52½
Carvacrol	lb.	—	.78
Deenax	lb.	.95	1.05
Di-tert-Butyl-para-Cresol	lb.	.91	.95
Eugenol C-95%	lb.	3.34	3.54
Flectol H	lb.	.50½	.57½
Flexamine	lb.	.69½	.71½
Neozone A	lb.	.52½	.54¼
C	lb.	—	.69½
D	lb.	.50½	.52½

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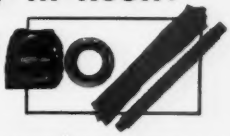

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ANTI-OXIDANTS (Cont'd)

Oxidex	lb.	—	3.60
PDA-10 and 20	lb.	.39	.41
Permalux	lb.	—	2.10
Resorcin, Tech. (dlvd.)	lb.	.82½	.83½
Santoflex AW	lb.	.75	.82
B	lb.	.59½	.52½
BX	lb.	.62	.69
33	lb.	.69½	.76½
Santovar-A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.60	1.67
Santowhite L	lb.	.50½	.57½
MS	lb.	1.29	1.36
S.C.R. (tons)	lb.	.32	.34
Sequestrene AA	lb.	—	1.00
NA2	lb.	—	.82
NA3	lb.	—	.80
Stabilite	lb.	.53	.55
Alba	lb.	.72	.77
L	lb.	.53	.55
White	lb.	.49	.51
Stabilizer No. 1	lb.	—	1.55
Stabilizer No. 9A	lb.	.80	1.05
Sunolite	lb.	.20	.23
Tannic Acid, Tech.	lb.	.46	.48
Thermoflex A	lb.	.98	1.00
V-G-B	lb.	.67	.69
Wing-Stay S	lb.	.49½	.50½

ANTI-SCORCHING AGENTS

Armeen HT	lb.	.34	.42
Benzoic Acid—Tech.	lb.	—	.43
Goodrite Vultrol	lb.	.60	.62
Sodium Acetate 60-62% Crystals	lb.	—	.06

ANTISEPTICS AND GERMICIDES

Arquad S	lb.	.22	.25
Formaldehyde (dms.)	lb.	.066	.071
G-4 (bbls.)	lb.	1.04	1.19
G-11	lb.	2.60	2.75
Nuodex 100 S.S. (dlvd.)	lb.	—	1.10
Nuodex 100 W.D. (dlvd.)	lb.	—	1.25
Nuodex Zinc 8% (dms.) (dlvd.)	lb.	.24	.28
Ortho Cresol (26°-27°)	lb.	—	.201
Retarder D	lb.	.42	.50
Soligen Drier—Copper 8% (dms.)	lb.	.231½	.243½
Copper 6% (dms.)	lb.	.183½	.195½
Zinc 8% (dms.)	lb.	.222½	.233½
Zinc 8% (dms.)	lb.	—	.211½
Vancide	lb.	—	.80

ANTI-WEEDING AGENTS (for Latex)

Webnix 34	lb.	1.50	2.25

AROMATICS (DEODORANTS)

Alamasks	lb.	.50	6.50
Bouquet 149	lb.	—	3.00
Coumarin	lb.	—	2.75
Curodex 19	lb.	—	4.75
188	lb.	—	5.75
198	lb.	—	6.75
Deodorant 65	lb.	—	1.85
Deodorant L-37	lb.	2.00	2.40
L-44	lb.	2.50	2.90
N.L.T.X.	lb.	1.85	2.15
Deodorant Oil GD 3427	lb.	1.70	2.00
GD 6422	lb.	2.00	2.50
GD 6423	lb.	1.60	1.90
GD 6575	lb.	2.45	2.95
GD 31063	lb.	2.65	3.15
Latex Perfume 5	lb.	—	3.25
6	lb.	—	7.50
9	lb.	—	.65
Naugarones (dms.)	lb.	1.30	3.00
Neutroleum Delta	lb.	—	2.60
Gamma	lb.	—	3.60
Parador A	lb.	1.95	2.25
C	lb.	2.75	3.25
E	lb.	.25	.55
GD 5280	lb.	2.00	2.50
GD 5348	lb.	1.90	3.25
Perfume Oil Bouquet Vanilla M	lb.	2.40	2.75
Rodo No. 0	lb.	4.00	4.50
No. 10	lb.	5.00	5.50
Rubbatone (dms.)	lb.	1.00	3.80
Rubber Perfume 12	lb.	—	2.85
Russian Leather 7	lb.	—	4.35
Vanillin	lb.	3.00	4.05

BLOWING AGENTS

Ammonium Bicarbonate (dlvd.)	lb.	.0725	.1075
Blowing Agent CP-675	lb.	—	.35
Sodium Bicarbonate, U.S.P. (c.l. bags)	cwt.	—	2.10
Sponge Paste	lb.	—	.20
Unicel	lb.	—	.82
ND	lb.	—	1.40
S	lb.	—	.20
Urea	lb.	.0425	.0475

BONDING AGENTS

Braze	gal.	6.00	7.50
Durez 2987	lb.	.48	.53
MDI	lb.	5.00	5.50
50	lb.	2.75	3.25
Penacolite B1A	lb.	—	.88
Phobond 20	gal.	2.91	4.23
30	gal.	3.63	4.97

BONDING AGENTS (Cont'd)

Reanite	gal.	6.75	7.25
Rex Compounds	gal.	1.30	2.85
Ty-Ply Q (BN & S)	gal.	6.75	8.00

COAGULANTS

Acetic Acid—56% (bbls.)	cwt.	9.00	11.00
Glacial—99½% (bbls.)	cwt.	14.05	14.55
Calcium Nitrate, Tech., Crystals	lb.	.07	.17
Hydroxyacetic Acid—70% (dms.)	lb.	—	.084
Zinc Nitrate, Tech.	lb.	—	.221½

COLORING AGENTS

Black

Aquablak B (also M, R)	lb.	.08	.111¼
Aquablak S	lb.	.11	.111½
Black Shield 4-35 (dms.)	lb.	—	.0825
Carbon Black—See *Reinforcing Agents*			
Lampblack No. 10	lb.	.06	.09
Mapico Black Iron Oxide (50 lb. bags)	lb.	.11¾	.12
Pure Black Iron Oxide	cwt.	11.75	12.00

Blue

Blue GD, Dispersed	lb.	—	4.55
Blue GD Paste	lb.	—	1.80
Milori Blue	lb.	.45	.48
Monastral Fast Blue CPL	lb.	—	1.77
PCD, Dispersed	lb.	—	2.50
Ramapo Blue	lb.	3.40	3.45
Rubber Blue X-1999	lb.	—	1.70
Stan-Tone Blue	lb.	1.40	4.00
Ultramarine	lb.	.14	.30
Vansul Blue M.B.	lb.	.90	2.65
Victoria Blue BP-262-D	lb.	2.25	2.30

Brown

Brown Iron Oxide	lb.	.11¾	.12
Mapico Brown (50 lb. bags)	lb.	.12¾	.13

Green

Filo Green	lb.	—	.32
Green Chromium Oxide, Pure	lb.	.37½	.44½
Green Chromium Oxide, Pure, Hydrated	lb.	.95	1.05
Green FD, Dispersed	lb.	—	1.85
Monastral Fast Green GSD, Dispersed	lb.	—	3.20
GSL	lb.	—	1.97
Permansa Green CP-594	lb.	—	1.35
Pigment Green B	lb.	—	1.35
GL-652D	lb.	.88	.93
Ramapo Green	lb.	—	4.00
Rubber Green X-1293	lb.	—	1.15
Stan-Tone Green	lb.	1.50	3.30
Vansul Green M.B.	lb.	1.05	3.05

Maroon

Stan-Tone Maroon	lb.	3.00	3.05
Vansul Maroon M.B.	lb.	1.05	2.80

Orange

Molybdate Orange	lb.	—	.44
Orange FD, Dispersed	lb.	—	2.75
Rubber Orange X-2065	lb.	—	3.00
Stan-Tone Orange	lb.	1.65	4.00
Vansul Orange M.B.	lb.	2.25	2.60

Red

Antimony Trisulfide	lb.	.72	.78
R. M. P. Sulfur Free	lb.	—	.78
R. M. P. No. 3	lb.	—	.72
Cadmium Red	lb.	.95	1.25
Cadmolith Red (bbls.)	lb.	1.75	2.00
Graphic Red (dlvd.)	lb.	—	.85
Indian Red, American, Pure	lb.	.12½	.12½
Doxco (English)	lb.	.11½	.11¾
Mapico Reds (50 lb. bags)	lb.	.1225	.1250
Oximony Iron Oxide	lb.	—	.09
Red Iron Oxide, Light	lb.	.12½	.13½
Red PBD, Dispersed	lb.	—	1.75
2BD, Dispersed	lb.	—	1.80
2BL	lb.	—	1.32
PBL	lb.	—	1.65
Rubanox Red CP-762 (dlvd.)	lb.	—	1.40
Rubber Red CP-339 (dlvd.)	lb.	—	1.10
Rubber Red RT-364	lb.	—	.75
Rubber Red RT-425	lb.	—	.75
Rubber Red X-1148	lb.	—	.85
Rubbered	lb.	.1150	.1175
Solfast Red	lb.	1.40	1.95
Stan-Tone Red	lb.	1.10	3.05
Sun Burnt Red	lb.	.1150	.1175
Vansul Red M.B.	lb.	.95	3.40
Watchung Red	lb.	—	1.95

White—Lithopone

Albalith	lb.	.0750	.0850
Cryptone BT	lb.	.10	.11
Eagle	lb.	.06¼	.06¼
Permolith	lb.	.0790	.0890
Ponolith	lb.	.0790	.0865
Sunolith	lb.	.0790	.0865

COLORING AGENTS (Cont'd)

White—Titanium Pigments

Ti-Cal	lb.	.08	.08¾
Ti-Pure	lb.	.21	.24
Titanox A—all grades (dlvd.)	lb.	.21	.22
RA (dlvd.)	lb.	.23	.24
RA-10 (dlvd.)	lb.	.23	.24
RA-NC (dlvd.)	lb.	.23	.24
RC (dlvd.)	lb.	.08¼	.08¾
RC-HT (dlvd.)	lb.	.08	.08½
Unitane O-220	lb.	.195	.205
OR-250	lb.	.215	.225
Zopaque	lb.	.21	.22

White—Zinc Oxide (American Process)

AZO-ZZZ 11 (and 22, 23, 44, 55)	lb.	.1475	.1575
Eagle	lb.	.1475	.1575
Horse Head Special	lb.	.1475	.1575
XX Red	lb.	.1475	.1575
XX-505	lb.	.1625	.1725
Protox 166	lb.	.1475	.1575
167	lb.	.1475	.1525
St. Joe Black Label	lb.	.1475	.1575
Green Label	lb.	.1475	.1575
Red Label	lb.	.1475	.1575

White—Zinc Oxide (Dispersed)

Dispersed Zinc Oxide	lb.	—	13

White—Zinc Oxide (French Process)

AZO-ZZZ 66	lb.	.1700	.1800
Eagle Green Seal	lb.	.1650	.1750
Eagle Red Seal	lb.	.1600	.1700
Eagle White Seal	lb.	.1700	.1800
Florence Green Seal	lb.	.1650	.1750
Red Seal	lb.	.1600	.1700
White Seal	lb.	.1700	.1800
Kadox 25	lb.	.1700	.1800
Kadox 15, 17 and 72	lb.	.1475	.1575
U. S. P. 12	lb.	.1800	.1900

White—Zinc Sulfide

Cryptone ZS-800	lb.	.2530	.2630

Yellow

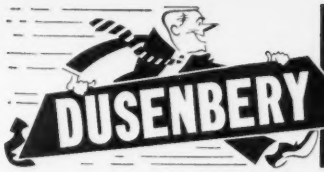
Benzidine Yellow	lb.	1.91	2.15
Cadmolith Yellow (bbls.)	lb.	—	1.27
Chrome Yellow	lb.	—	.31
Iron Oxide, Pure	lb.	.10	.10¼
Mapico Yellow (50 lb. bags)	lb.	.1000	.1025
Rubber Yellow X-1940	lb.	—	2.15
Stan-Tone Yellow	lb.	1.00	2.25
Toluidine Yellow	lb.	—	1.91
YL-556-D	lb.	—	.82
Oximony Iron Oxide	lb.	—	.06¾
Vansul Yellow M.B.	lb.	1.05	1.85
Yellow GD, Dispersed	lb.	—	2.15
GL	lb.	—	1.62
Zinc Yellow	lb.	—	.25

DISPERSING AGENTS

Anchoid*	lb.	.24	.25
Armeen 18	lb.	.42	.50
Blancol Conc. Powder	lb.	.15½	.17½
Darvan No. 1 (and No. 2)	lb.	.22	.30
Daxad 11 (21, 23)	lb.	.08	.35
Dispersaid	lb.	1.25	1.35
Furala	lb.	.06½	.07½
Halloid	lb.	.04½	.05½
Lomar PW	lb.	—	.16
Marasperse C	lb.	.06½	.06¾
CB	lb.	.12¼	.13¼
N	lb.	.09½	.10½
Modicol C	lb.	.08	.12
Rubbex	lb.	.267	.285
Stan-Chem BQC	lb.	.12¼	.17¼
1067	lb.	—	.13½
1471	lb.	.1687	.2187
2251	lb.	.12¼	.17¼
Trenamine D-25	lb.	.32½	.36
Triethanolamine (drums) (dlvd.)	lb.	.24½	.27½
Yelkin TT	lb.	.14	.18
Zinsper	lb.	—	.15

EXTENDERS

Advagum 1098	lb.	—	.64
Arceo 1071-13B	lb.	.14½	.15½
1073-18B	lb.	.13½	.14½
1294-36B	lb.	.11½	.12½
Bunaweld Polymer No. 780	lb.	—	.22
No. 5514	lb.	—	.35
D-92 (and D-93) (dms.)	lb.	—	.12
Car-Bel-Ex-A	lb.	—	.14
Extender 600	lb.	—	.1480
Polyco 418	lb.	.17	.18
PR-162 Latex Extender	gal.	—	1.55
Synprolac	lb.	.16	.23
Synprowax	lb.	—	.23
Vistanex	lb.	—	.32



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Marter White	ton	18.50	- 30.00
Barium Carbonate (l.c.l.)	ton	72.50	- 90.00
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No. 2 Floated, Unbleached	ton	35.85	- 51.60
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Argosite Clay (c.l.)	ton	——	- 12.50
Bennett Clay (c.l.)	ton	——	- 32.50
SPV Volclay (c.l.)	ton	——	- 12.50
Blanc Fixe	ton	72.50	-120.00
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Atomite (c.l.)	ton	——	- 30.00
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Snow White Filler	ton	——	- 20.50
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Lorite	ton	——	- 30.00
Flock			
Cotton, white and colored	lb.	.13	- .33
Filfloc F 40-9000	lb.	——	- .16
Filfloc F 6000	lb.	——	- .40
Polycel	ton	110.00	-210.00
Rayon, bleached or dyed	lb.	.87	- 1.50
Rayon, grey	lb.	——	- .18
Rayon, pink	lb.	——	- .18
Solka-Floc (l.c.l.)	lb.	.07	- .16
Wool, bleached or dyed	lb.	.70	- 1.00
Glue, Bone (dlvd.)	lb.	.18	- .20¼
Leather, Shredded	lb.	.05	- .17
Lignin	lb.	.03	- .06
Indulin	lb.	.09	- .10
Limestone, Pulverized	ton	3.25	- 10.00
Georgia Marble No. 10	ton	——	- 10.00
Industrial Filler No. 100	ton	——	- 5.75
Micro Velva	ton	45.00	- 48.00
Velvet Filler, Superfine	ton	——	- 27.00
Magnesium Carbonate	lb.	.0950	- .1050
K & M Clearcarb	lb.	.1225	- .1275
Magnesium Oxide	lb.	.05	- .06

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Magnesium Silicate	ton	18.00	- 35.00
Airex	ton	25.00	- 27.00
Asbestol	ton	——	- 25.00
Blue Star Talc	ton	——	- 23.00
L.S. Silver	ton	23.50	- 25.50
Sierra White	ton	21.25	- 23.25
Mica	lb.	.01¾	- .07¼
Concord	lb.	.07	- .07¼
Micro-Mica	lb.	.06¼	- .07½
Mineralite (c.l.)	ton	25.00	- 85.00
Silversheen	lb.	.07¼	- .08
Triple A Mica (c.l.)	ton	——	- 25.00
Vermiculite	lb.	——	- .11
Wet Ground Biotite Mica	lb.	.05½	- .06¼
Wet Ground Mica No. 160	lb.	.07	- .07¼
Pyrophyllite			
Pyrax A (c.l.)	ton	——	- 13.50
WA (c.l.)	ton	——	- 16.00
Silica	ton	16.00	- 27.00
Blue Star	ton	——	- 20.60
Silex, Powdered (l.c.l.)	ton	15.00	- 20.00
Talc, Domestic	ton	10.00	- 27.00
Nytal 200	ton	——	- 25.00
300	ton	——	- 36.00
Walnut Shell Flour	ton	45.00	-111.00
Whiting, Commercial	ton	——	- 7.00
Camel-Carb	ton	——	- 10.00
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Georgia Marble No. 15	ton	——	- 15.00
No. 16	ton	——	- 16.00
Keystone (c.l.)	ton	——	- 16.00
Rambo No. 1 White	ton	——	- 8.50
No. 6 White	ton	——	- 9.00
Snowflake (c.l.)	ton	——	- 18.00
Veroc (c.l.)	ton	——	- 8.50
Welco (c.l.)	ton	——	- 8.50
York White R (c.l.)	ton	——	- 8.50
Wood Flour	ton	22.00	- 49.00

FINISHING MATERIALS, SURFACE

Beaco Finishes	gal.	2.10	- 2.35
Black Out	gal.	4.50	- 8.00
Shellac, Orange Gum	lb.	.40	- .45
VanWax	gal.	1.45	- 1.50

FLAME RETARDANTS

Celluflux	lb.	.36½	- .38½
Chlorinated Paraffin 42	lb.	——	- .14¾
Chlorowax 70	lb.	.18	- .19
Halowax	lb.	.27	- .42
Zinc Borate 3167	lb.	.1920	- .2020
Zyrox	lb.	.49	- .78

LUBRICANTS, MOLD

Aquadag	lb.	3.50	- 4.00
Aquarex D	lb.	——	- .80
I	lb.	——	- .94
MDL	lb.	——	- .33
WAQ	lb.	——	- .28
Akro Gel	lb.	——	- .165
Borax, Granular (l.c.l.)	ton	81.00	- 86.00
Carbowax 4000	lb.	.33	- .34
Colite Concentrate (dms.)	gal.	——	- .90
Concentrex	lb.	——	- .25
D.C. 7 Compound	lb.	5.25	- 6.50
D.C. Emulsion No. 7	lb.	1.90	- 2.32
No. 35	lb.	1.59	- 3.50
No. 35A	lb.	1.59	- 3.50
No. 35B	lb.	1.59	- 3.50
D.C. Mold Release Fluid	lb.	3.70	- 6.00
Dipex	lb.	.14	- .18
Dri-Lube	lb.	——	- .22
Glydag	lb.	1.30	- 2.00
Hawkeye Flake (dlvd.)	lb.	——	- .11
Kokobace	lb.	——	- .12
Lubrex	lb.	.25	- .30
Lubri-Flo	gal.	10.00	- 12.00
Migralube	lb.	——	- .35
Mold Lubricant No. 72 Conc.	gal.	2.50	- 4.00
No. 735	gal.	1.26	- 2.75
No. 769	gal.	1.20	- 2.60
Moldeze No. 3	gal.	5.00	- 6.00
Mold-Brite	gal.	——	- 1.50
Mold-Slick	lb.	.253	- .271
Mold-White	gal.	——	- 2.00
Monopole Oil MD	lb.	——	- .23
Nopcolube	lb.	——	- .15
Orvus WA Paste (dms.)	lb.	——	- .26
Prodag	lb.	.28	- .42
Purity Flake (dlvd.)	lb.	——	- .13
Rubber-Flo	gal.	1.25	- 1.60
Rubber-Glo	gal.	——	- .94
Rusco Mold Paste	lb.	——	- .25
Sericite (l.c.l.)	ton	65.00	- 75.00
Thermalube	lb.	——	- .13¾
Ucon Lubricants	lb.	.28	- .37
Ulco Mold Soap	lb.	.12	- .23

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Diglycol Stearate Neutral (and SE) (dms.)	lb.	——	- .25
Extrud-o-Lube	gal.	——	- 1.84
G.B. Naphthenic Neutrals	gal.	.11	- .18
Latex-Lube GR (dlvd.)	lb.	.19¼	- .20
Pigmented (dlvd.)	lb.	.18¾	- .19¾
RS	lb.	——	- .16½
Liqui-Lube (dlvd.)	lb.	——	- .16¾
NF (dlvd.)	lb.	——	- .16¾
NT (dlvd.)	lb.	——	- .16¾
Propylene Stearate (dms.)	lb.	.68	- .78

LUBRICANTS, RUBBER SURFACE

Barium Stearate	lb.	.37	- .39
Calcium Stearate	lb.	.35	- .37
D.C. 4 Compound	lb.	5.13	- 6.50
D.C. 200 Fluid	lb.	3.70	- 6.00
Glycerized Lubricant	gal.	——	- 1.48
Hydro-Zinc	lb.	——	- .20
Polyethylene Glycol	lb.	.26½	- .29
Rexanol	lb.	——	- .11
Separex	lb.	——	- .25
Stock Lube	lb.	——	- .19
Slab-Dip	lb.	——	- .15
Wet-Zinc	lb.	——	- .22¼
Zinc Stearate	lb.	.37	- .39
Z.S.D. Dispersion	lb.	——	- .20

MOLD CLEANERS

Actusol (dlvd.)	gal.	1.45	- 1.65
Alkon (dlvd.)	lb.	.16	- .16½
Metso 99	cwt.	4.00	- 5.85
Granular	cwt.	3.50	- 5.15
Rubber-Sol	gal.	2.97	- 3.97
Shellblast	ton	80.00	-140.00
Sprex A.C. (dlvd.)	lb.	.17¾	- .18¾

PEPTIZING AGENTS

Peptizer P-12	lb.	.84	- 1.00
Pepton 22	lb.	.74½	- .77½
RPA 2	lb.	——	- .77½
3	lb.	——	- .47½
3-RO	lb.	——	- .50½
5	lb.	——	- .59

PLASTICIZERS & SOFTENERS

AA (dms.)	lb.	.28	- .28½
Acto 500	lb.	——	- .09
Adipol BCA (dms.)	lb.	.45½	- .46
2EH	lb.	.47½	- .48½
10A	lb.	.47½	- .48½
ODY	lb.	.51¾	- .52¾
American Pine Tar	lb.	.0410	- .0678
Arnel	lb.	.22	- .27
Arolene 1980 (c.l.)	lb.	——	- .10
Aromatic Tar	gal.	.0573	- .1973
Bardol	lb.	.02½	- .03½
B	lb.	.05¾	- .06
Bayol D	gal.	——	- .382
F	gal.	——	- .52
Beeswax, Bleached	lb.	.85	- .90
Yellow Refined	lb.	.70	- .75
Bondogen	lb.	.55	- .60
B.R.C. No. 20	lb.	.0150	- .0160
B.R.H. 2	lb.	.0280	- .0290
BRS 700	lb.	.0175	- .0260
B.R.T. 3	lb.	.024	- .025
4	lb.	.0225	- .0235
7	lb.	.0265	- .0275
B.R.V.	lb.	.0350	- .0513
Bunarex Resins	lb.	.06½	- .07¼
Bunatak AH	lb.	.08	- .09
U	lb.	——	- .17½
No. 90	lb.	——	- .09
No. 210	lb.	——	- .14
Burgundy Pitch	lb.	.0843	- .0888
Butac	lb.	.10½	- .11½
Butoxyethyl Diglycol Carbonate	lb.	.40	- .41
Butyl Benzyl Sebacate	lb.	.61	- .63¾
Butyl Carbitol Perlargonate (dms.)	lb.	——	- .643
Butyl Cellosolve Perlargonate (dms.)	lb.	——	- .68
Butyl Palmitate	lb.	——	- .26½
Butyl Roleate	lb.	.176	- .18
Butyl Stearate-CP)dms.)	lb.	.31	- .32
BWH-1	lb.	——	- .14
Cabflex Di-BA (dms.)	lb.	.42	- .44¾
Di-OA (dms.)	lb.	.43½	- .46¼
Di-OP (dms.)	lb.	.40	- .42¾
Califlux 510, 550	lb.	.025	- .0325
G.P.	lb.	.0125	- .02
R-100	lb.	.04½	- .05¼
TT	lb.	.02	- .02¾
Candelilla Wax Prime	lb.	.67	- .75
Caprul Benzyl Sebacate	lb.	.67½	- .70¼
Carbonex	lb.	.0325	- .0375
S Flakes	lb.	.04	- .0475
S Plastic	lb.	.0410	- .0460
644	lb.	.0375	- .0425
Carbowax 4000 (drums)	lb.	.33	- .34
Cardolite 615	lb.	.33¾	- .36¼
816	lb.	.25¾	- .28¾
Carnauba Wax, Crude	lb.	.95	- 1.10
Refined	lb.	.87	- .94
Substitute	lb.	.45	- .88
Yellow	lb.	1.15	- 1.20
Celluflex (dms.)	lb.	.34	- .35
Ceresine Wax	lb.	1.4	- .26
Chlorowax 40	lb.	.16	- .17
Contogum	lb.	.06¼	- .10¼
CTLA Polymer	gal.	.17½	- .32½
Cumar Resins	lb.	.05½	- .14½
D.C. 200 Fluid	lb.	4.14	- 6.00
D.B.M.	lb.	——	- .30
Degras, Common	lb.	——	- .12
Dibenzyl Sebacate	lb.	.74	- .76¾
Dibutoxethyl Sebacate	lb.	——	- .563⁄4
Dibutyl Phthalate	lb.	.36	- .41¾
Dibutyl Sebacate—Tech.	lb.	.59	- .61¾
C.P.	lb.	.61	- .63¾
Dicaprul Adipate	lb.	.40½	- .43¾

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PLASTICIZERS & SOFTENERS (Cont'd)

Dicapryl Phthalate	lb.	.37	.39¾
Dicapryl Sebacate	lb.	.61½	.63¾
Di-Carbitol Phthalate (dms.)	lb.	.42	.42½
Dicyclohexyl Phthalate	lb.	——	.42
Diethyl Phthalate (t.c.)	lb.	.29½	.32¼
Di-2-ethlyhexyl Phthalate (t.c.)		——	.37
Dihexyl Adipate	lb.	.33	.35¾
Dihexyl Phthalate	lb.	.28½	.31¾
Dihexyl Sebacate	lb.	.50	.52¾
Di Isobutyl Azelate (dms.)	lb.	.44	.45½
Di-iso-octyl Adipate (dms.)	lb.	.40½	.43¼
Di-iso-octyl Phthalate (t.c.)	lb.	.37	.39¾
Dimethyl Phthalate (t.c.)	lb.	.29¾	.30¾
Dimethyl Sebacate	lb.	.77	.79¾
Dinopol	lb.	.42¾	.43¾
Dioctyl Phthalate (dms.)	lb.	.41¾	.42¾
Dioctyl Sebacate (dms.)	lb.	.62½	.65¾
D.I.D.P. (dms.)		.41¾	.42¾
Dipolymer Oil	gal.	——	.34
Dispersing Oil No. 10	lb.	.05½	.05¾
Dutrex B	lb.	.02¾	.03¾
5 and 6	lb.	.020	.031
15E	gal.	.10	.20
20, 21, 22 and 25	lb.	——	.04
Elastex 10-P	lb.	.40	.42½
50-B	lb.	.34½	.37
DCHP	lb.	.42½	.43¼
Estac	lb.	——	.16
Ethox (dms.)	lb.	.45½	.45¾
Flexol B-400	lb.	.28	.30
DHP	lb.	.46	.48¾
DOP	lb.	.40	.42¾
TOF	lb.	.49	.51¾
3GH	lb.	.44	.46
3GO	lb.	.53	.55
4GO	lb.	.37	.39¾
8HP	lb.	.40	.42¾
Flexricin P-1 (and 4)	lb.	.40	.41¾
P-4C			.37¾
P-8			.41¾
Pale 4	lb.	.35¾	.37¾
Galex W-100	lb.	.15½	.19¾
G. B. Light Process Oil	lb.	.025	.0325
Medium Process Oil	lb.	.031½	.04¼
G. B. Naphthenic Neutrals	gal.	.11	.18
Good-Rite GP233	lb.	.45¾	.48½
GP261	lb.	.40	.42¾
Harflex 500 (dms.)	lb.	.36¼	.39¼
Hercolyn (dlvd.)	lb.	.20	.20½
Herron-H.T.	gal.	.16	.27
Herron-Plas	lb.	——	.03¾
Herron-Wax	lb.	.05¾	.06
No. 23	lb.	.08¼	.08¾
No. 24	lb.	.07¼	.07¾
HSC No. 13	lb.	.27	.30
Hylene B	lb.	.45	.50
C	lb.	.41	.46
D	lb.	.47½	.52½
Indonex 632½ (633½, 634½, 638½)	gal.	.1100	.1700
Kapsol	lb.	.34	.35
Kenflex	lb.	.19	.27
Kessoflex 101 (dms.)	lb.	——	.39
102 (dms.)	lb.	——	.32½
103 (dms.)	lb.	——	.41½
104 (dms.)	lb.	——	.48
105 (dms.)	lb.	——	.33½
106 (dms.)	lb.	——	.35¼
KP-23 (dms.)	lb.	.31	.32
120 (dms.)	lb.	.31	.32
140 (dms.)	lb.	.4774	.4825
201	lb.	.54¾	.55¼
504	lb.	.35¾	.36¾
555	lb.	.33	.33½
Kremol 40	gal.	.36	.46
Kremol 40	gal.	.39	.49
50	gal.	.39	.49
Kromsol (drums)	gal.	.38¾	.39¾
Kronitex (drums)	lb.	.37¼	.38¾
Lanolin, Tech. Anydrous	lb.	.21	.23
Lead Oleate	lb.	——	.30½
Lindol (dms.)	lb.	.34	.35
2-Mercaptoethanol (drums)	lb.	1.25	1.50
Methox (dms.)	lb.	.41¾	.41¾
Methyl Laurate	lb.	.25	.27
Methyl Oleate	lb.	——	.20
Methyl Stearate (dms.)	lb.	——	.30
Modicol G	lb.	——	.23
R	lb.	——	.17
Montan Wax, Crude	lb.	.15	.18
Monten Wax	lb.	.12	.13
Montiy Wax	lb.	——	.30½
Morflex No. 100	lb.	.37	.38¾
Natac	lb.	.10	.11
Nebony Resins (dms.)	lb.	.04	.04½
Neolene 210 (t.c.)	lb.	——	.16
212 (t.c.)	lb.	——	.14
220 (t.c.)	lb.	——	.15
Nerium	lb.	——	.09
Nevillac Resins (dms.)	lb.	.28	.55
Neville Resins (dms.)	lb.	.12	.18
Nevindene Resins (dms.)	lb.	.15	.18
Nevinol (dms.)			.20
Nevoll	lb.	.02½	.03½
Nevtex 10 (dms.)	lb.	.11	.12½
Nuba 1 (and 2) (dms.)	lb.	.05¼	.06¼
3X (dms.)	lb.	.07¾	.08¾
15 (and 30) Oil (dms.)	lb.	.36¼	.38
No. 480 Oil Proof Resin	lb.		.18
Ohopex Q10 (dms.)	lb.	.40¾	.41¾
Opalwax	lb.	.37	.38
Ortho-Nitrobiphenyl	lb.	.06	.11
Ozokerite Wax No. 64 White	lb.	.31	.32
Yellow	lb.	.25	.26

PLASTICIZERS & SOFTENERS (Cont'd)

Palm Oil	lb.	——	.11
Paradene Resins (dms.)	lb.	.06½	.07½
Para Flux (dms.)	gal.	.1925	.2035
2046 (dms.)	gal.	.22	.23
Para Lube (t.c.l.)	lb.	.046	.048
Parmo	lb.	.06	.13½
Pepton 22	lb.	.72	.75
PG-16 (drums)	lb.	——	.22¼
Picco 10 (and 25)	lb.	——	.13½
75 (and 100)	lb.	——	.13
Rubber Resin 100	lb.	.1855	.1905
S.O.S.	gal.	——	.29
Piccocizer 30	lb.	——	.05½
Piccolastic A (and B, C, D, E)	lb.	.28½	.29
F1, FHF and FX	lb.	——	.1815
T-135	lb.	.22¼	.23¼
Piccolyte S Resins	lb.	.18¼	.20
Piccolyte WW Resins	lb.	.45	.47
Piccoumaron Resins	lb.	.06¾	.17
Piccovar	lb.	.14½	.15
Piccovol	lb.	——	.02½
Pictar	gal.	——	.23
Pigmentar	lb.	.0410	.0678
Pigmentarol	lb.	.0410	.0678
Plastac M	lb.	——	.09¼
Plasticizer 2286	lb.	——	.26¼
Plasticizer SC	lb.	.49	.52
Plasticizer W-13	lb.	.37	.38¾
Plasticizer XP-3	lb.	——	.50
Plastoflex 50	lb.	.34	.38
55	lb.	.34	.38
520	lb.	.37½	.38½
VS	lb.	.40	.43
Plastogen	lb.	.07¾	.08
Plastolein 9050 (c.l.)	lb.	.59¼	.62¼
9055	lb.	.37½	.40½
9058	lb.	.57	.60
9250	lb.	.27	.30
9715	lb.	.37½	.40½
Plastone	lb.	.27	.30
Polycin 781	lb.	.40	.41
Polyco 438	lb.	.34	.36
Polymel C-128	lb.	.19½	.20½
D	lb.	.22	.24
H-2	lb.	.22	.24
6	lb.	.06¾	.10
7	gal.	.23	.28
Process Oil C-255 (c.l.)	gal.	——	.22
Propylene Stearate (dms.)	lb.	——	.32
PT 400 Pine tar (600, 800) (t.c., dms.)	lb.	.0410	.0534
PX-104	lb.	.34	.42
PX-108	lb.	.38	.46
PX-208	lb.	.41½	.49
PX-404	lb.	.60	.68
Reogen	lb.	.13½	.13½
465 Resin (dms.)	lb.	.07	.07½
Resin 731-C	cwt.	——	15.00
Resin C	lb.	.0200	.0285
Resinex	lb.	.03¼	.03¾
L-4	lb.	.02¾	.03
Rexflex	lb.	——	.15
Rosin Oil	gal.	.54	1.20
R.P.A. No. 2	lb.	——	.65
No. 3	lb.	——	.46
No. 5	lb.	——	.57
R.S.O. Softening Oil	lb.	.03	.05
Rubberol	lb.	——	.23¼
Rubtar	gal.	——	.40
Santicizer B-16	lb.	.50	.52
E-15	lb.	.47	.49
M-17	lb.	.44	.46
No. 107	lb.	.40	.42½
No. 140	lb.	.29	.31
No. 141	lb.	.40	.42½
No. 160	lb.	.34	.36
Sherolatum	lb.	.03½	.06
Softener No. 20	lb.	.09	.25
Staflex IXA	lb.	.34	.36
Stanolind Petrolatum	lb.	.048	.086
Wax	lb.	.31	.32¼
Staybelite Resin (dms.)	cwt.	——	12.00
Sunny South Burgundy Pitch	lb.	.0980	.1025
Sunny South Pine Tar	lb.	.0410	.0678
Sunny South Rosin Oil	gal.	.58	.87½
Superla Wax	lb.	.27¾	.32
Syncera Wax	lb.	.19	.24
Syn Tac (c.l.)	gal.	——	.33
Synthetic Revertant Oil	lb.	——	.16
Tar, Refined	gal.	.12	.17
K-Tarnel NR (t.c.)	gal.	——	.0851
Terpene A	gal.	——	.65
TP-90B	lb.	——	.67
TP-95	lb.	——	.65
TP-98	lb.	——	.65
Triacetin	lb.	.34	.45
Tricresyl Phosphate (t.c.)	lb.	——	.35
Turgum S	lb.	.08¼	.09¾
Vanadiset A	gal.	.13	.20
Vistac No. 1	gal.	1.00	1.16
P	lb.	.18	.18¼
Vopcolene 50	lb.	——	.37
Witresin—Granular	ton	41.00	43.00
Solid	ton	36.00	38.00

PROCESSING AIDS

Castor Oil, Processed (dms.)	lb.	——	.35¼
Refined (drums)	lb.	——	.19¼
Castorwax (min. 250 lbs.)	lb.	——	.27¼
Dutrex 7	lb.	.12	.20
ELA	lb.	——	.80
Millrex	lb.	——	.15

PROCESSING AIDS (Cont'd)

Resin No. 510	lb.	.13¾	.16½
Zyrox	lb.	.50	.79

PROTECTIVE & STABILIZING AGENTS

Acacia	lb.	.12¾	.21
Alpha Protein	lb.	.20	.28
Ammonium Alginate	lb.	——	.95
Aroostoocrat	lb.	——	.07½
Carob Bean Flour	lb.	——	.46
Casein	lb.	.28	.38
Ethylene Diamine 68%	lb.	.47	.50
Karaya Gum	lb.	.20	.50
Prosein	lb.	.0600	.0630
Rex Compound No. 2801	lb.	——	.15
Stablex B	lb.	.50	.95
K	lb.	.27	.35

RECLAIMING AGENTS

Armeen C	lb.	.50	.58
I	lb.	.42	.50
No. 517 H.B. Oil	gal.	.11¼	.16½
535	gal.	.22	.27
C-o Oil (and 28, 32)	gal.	.33	.38
C-10 Oil	gal.	.25	.30
C-33 Oil	gal.	——	.21½
Caustic Soda—Flake 76% (c.l., drums)	cwt.	——	3.75
Liquid 50% (t.c.)	cwt.	——	2.55
Solid 76% (c.l., dms.)	cwt.	——	3.35
Cresylic Acid (99-100%)	gal.	1.20	1.39
D-4	gal.	——	.27
E-8	gal.	——	.25
G. B. Reclaiming Oil	gal.	.12	.18
CD-10	gal.	.10	.16
CD-50-U	gal.	.18	.24
Gensol No. 6 (t.c.)	gal.	——	.45
Heavy Aromatic Naphtha	gal.	——	.12¼
LX-77 Reclaiming Solvent	gal.	.21	.33
LX-572 Reclaiming Oil	gal.	.27	.32
LX-777 Reclaiming Oil	gal.	.23	.33
Neo-Fat D-242	lb.	.05½	.07¾
PRR 1	gal.	.15	.35
PT 67 Light pine oil	gal.	.50	.60
PT 101 Pine tar oil	lb.	.0410	.0534
Q Oil	gal.	——	.286
Reclaiming Oil 1621	lb.	.03	.04
Reclaiming Oil 3186 (t.c.)	gal.	.28	.38½
Reclaiming Oil 3186-G	gal.	.25	.36¼
Reclaiming Reagent No. 4	lb.	.12	.15
R.P.A. No. 3	lb.	——	.46
RR-10	lb.	——	.35
Soda Ash (c.l., bags)	cwt.	——	1.50
Solvenol 1 (dms.)		——	.60
Solvent 534	gal.	.20½	.26½
Solvent Oil 21	gal.	.24	.29
C-42	gal.	.23	.28
Union Solvent 4060-O	gal.	——	.149
X-1 Resinous Oil	lb.	.0210	.0275

REINFORCING AGENTS—CARBON BLACK

Channel, Hard Processing (HPC) (bags)

Atlantic HPC-98	lb.	.0740	.1225
Continental F	lb.	.0740	.1225
Croflex	lb.	.0740	.1225
Dixiedensed (and S)	lb.	.0740	.1225
Kosmobile (and S)	lb.	.0740	.1225
Micronex HPC	lb.	.0740	.1225
Spheron 4	lb.	.0740	.1225
Witco Disperso No. 6	lb.	.0740	.1225

Channel, Medium Processing (MPC) (bags)

Atlantic MPC-95	lb.	.0740	.1225
Continental A	lb.	.0740	.1225
Croflex TH	lb.	.0740	.1225
Dixiedensed HM (and S-66)	lb.	.0740	.1225
Huber Arrow TX	lb.	.0740	.1225
Kosmobile HM (and S-66)	lb.	.0740	.1225
Micronex Standard	lb.	.0740	.1225
Spheron 6	lb.	.0740	.1225
Texas M	lb.	.0740	.1225
Witco Disperso No. 1	lb.	.0740	.1225

Channel, Easy Processing (EPC) (bags)

Atlantic EPC E-42	lb.	.0740	.1225
Continental AA	lb.	.0740	.1225
Croflex 77	lb.	.0740	.1225
Dixiedensed 77	lb.	.0740	.1225
Kosmobile 77	lb.	.0740	.1225
Micronex W-6	lb.	.0740	.1225
Spheron 9	lb.	.0740	.1225
Texas E	lb.	.0740	.1225
Witco Disperso No. 12	lb.	.0740	.1225
Wyex	lb.	.0740	.1225

Channel, Conductive (CC) (bags)

Continental R-40	lb.	.1800	.2400
Dixie 5 Dustless	lb.	.0950	.1550
Dixie Voltex	lb.	.1950	.2500
Kosmink Dustless	lb.	.0950	.1550
Kosmos Voltex	lb.	.1950	.2500
Spheron C	lb.	.1400	.1850
Spheron N	lb.	.2500	.3000
Voltex	lb.	.1950	.2500

Conductive Furnace Black (CFB) (bags)

Shawinigan Acetylene Black	lb.	.1600	.2200

Furnace, Fast Extruding (FEF) (bags)

Arovel	lb.	.0600	.1000
Croflex 50	lb.	.0600	.1000
Dixie 50	lb.	.0600	.1000
Kosmos 50	lb.	.0600	.1000
Statex M	lb.	.0600	.1000
Sterling SO	lb.	.0600	.1000

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REINFORCING AGENTS—CARBON BLACK (Cont'd)

Furnace, General Purpose (GPF) (bags)

Sterling V	lb.	.0500 -	.0900

Furnace, High Modulus (HMF) (bags)

Collocarb	lb.	.0550 -	.0950
Continex HMF	lb.	.0550 -	.0950
Croflex 40	lb.	.0550 -	.0950
Dixie 40	lb.	.0550 -	.0950
Kosmos 40	lb.	.0550 -	.0950
Modulex	lb.	.0550 -	.0950
Statex 93	lb.	.0550 -	.0950
Sterling L	lb.	.0550 -	.0950

Furnace, Medium Abrasion (MAF) (bags)

Philblack A	lb.	.0600 -	.1000

Furnace, Semi-Reinforcing (SRF) (bags)

Continex SRF	lb.	.0400 -	.0800
Croflex 20	lb.	.0400 -	.0800
Dixie 20	lb.	.0400 -	.0800
Essex	lb.	.0400 -	.0800
Furnex	lb.	.0400 -	.0800
Gastex	lb.	.0450 -	.0850
Kosmos 20	lb.	.0400 -	.0800
Pelletex	lb.	.0400 -	.0800
Sterling NS	lb.	.0400 -	.0800
Sterling R	lb.	.0450 -	.0850
Sterling S	lb.	.0400 -	.0800

Furnace, Fine (FF) (bags)

Statex 125	lb.	.1100 -	.1550
Sterling 99	lb.	.0650 -	.1050

Furnace, High Abrasion (HAF) (bags)

Aromex	lb.	.0790 -	.1250
115	lb.	.0890 -	.1290
Continex HAF	lb.	.0790 -	.1250
Croflex 60	lb.	.0790 -	.1175
Dixie 60	lb.	.0790 -	.1175
Kosmos 60	lb.	.0790 -	.1175
Philblack O	lb.	.0790 -	.1190
Statex R	lb.	.0790 -	.1250
Vulcan 3	lb.	.0790 -	.1220

Furnace, Super Abrasion (SAF) (bags)

Statex 125	lb.	.1100 -	.1550

Thermal, Fine (FT) bags)

P-33 (c.l.)	lb.	— -	.0350

Thermal, Medium (MT) (bags)

Thermax (c.l.)	lb.	— -	.0350
Thermax, Stainless (c.l.)	lb.	— -	.0450

REINFORCING AGENTS—SILICA

Hi-Sil	lb.	.10 -	.11½

REINFORCING AGENTS—MISCELLANEOUS

Darex Copolymer No. 3	lb.	.47 -	.49
X34	lb.	.42 -	.44
X43 (and 43E)	lb.	.42 -	.44
Darex Copolymer Latex No. 3 L (and X34L)	lb.	.36½ -	.39
Durez 12687 (and 12707)	lb.	— -	.37
Durez 13355	lb.	— -	.29½
Good-Rite Resin 50	lb.	.42 -	.44
Kralac A	lb.	.43 -	.44
Marbon S and S-1	lb.	.42 -	.49
8000	lb.	.42 -	.49
Marmix	lb.	.42 -	.49
Pliolite Latex 190	**lb.**	**.30 -**	**.34**
Pliolite NR	**lb.**	**.74 -**	**.76**
Pliolite S3, S6, and S6B	lb.	.42 -	.44
C-3 Masterbatch	lb.	.57 -	.64
C-4 Masterbatch	lb.	.55 -	.62
G Masterbatch	lb.	.44 -	.51
G50 Masterbatch	lb.	.44 -	.51
N Masterbatch	lb.	.48 -	.55
R Masterbatch	lb.	.62 -	.69
WA	lb.	.68 -	.75
S113V76	lb.	.48 -	.55
Polyco 220	lb.	.22 -	.23

RETARDERS

Dutch Boy Normasal	lb.	— -	.46
ESEN	lb.	.35 -	.37
Retarder ASA	lb.	— -	.57
Retarder PD	lb.	.35 -	.37
Retarder T.C.M.	lb.	— -	.65
Retarder W	lb.	— -	.44½
Retardex	**lb.**	**.47 -**	**.50**

RUBBER SUBSTITUTES

Mineral Rubber

38	**ton**	**38.00 -**	**40.00**
Black Diamond	**ton**	**38.00 -**	**40.00**
Byerlyte	**ton**	**47.00 -**	**54.00**
Gilsonite, Selects (c.l.)	ton	37.00 -	38.00
Hard Hydrocarbon (dms.)	ton	46.50 -	48.50
Herron Flake	ton	— -	45.00
Mineral Rubber, solid	**ton**	**42.50 -**	**44.50**
Pioneer	**ton**	**35.00 -**	**46.00**

Vulcanized Vegetable Oils (Factice)

Amberex	lb.	.29 -	.36
Brown	lb.	.1425 -	.2680
Dispersed	lb.	.26 -	.42
Neophax	lb.	.1570 -	.2680
White	lb.	.1440 -	.2850

Miscellaneous Rubber Substitutes

G.B. Asphaltenes	lb.	.06 -	.06½
Gilsowax B	lb.	.09 -	.11
Resin No. 1098 (drums)	lb.	— -	.62
No. 1198	lb.	.46¾ -	.49¾

SOLVENTS

Acetone (dlvd.)	lb.	.08½ -	.11
American Dipentine	gal.	.44½ -	.68
American Pine Oil	gal.	.75½ -	.95½
Amsco Lactol Spirits (t.c.)	gal.	— -	.18
Rubber Solvent (t.c.)	gal.	— -	.17
Solv A (t.c.)	gal.	— -	.25½
Solv A-80 (t.c.)	gal.	— -	.30½
Solv B (t.c.)	gal.	— -	.29
Solv B-90 (t.c.)	gal.	— -	.32
Solv D (t.c.)	gal.	— -	.30½
Special Naphthalite (t.c.)	gal.	— -	.17
Textile Spirits (t.c.)	gal.	— -	.18
Amyl Chlorides, Mixed (l.c.l.) (drums)	lb.	.10 -	.11
Benzol 90%	gal.	— -	.48
Butyl Acetate (t.c.)	lb.	.15¾ -	.17¾
Butyl Alcohol (t.c.)	**lb.**	**.13 -**	**.175**
Secondary (dlvd.)	lb.	.11 -	.13½
Tertiary (dlvd.)	**lb.**	**.12 -**	**.14½**
Carbon Bisulfide, Tech.	**lb.**	**.0440 -**	**.0800**
Carbon Tetrachloride	lb.	.08 -	.08½
Cosol 1	gal.	.37 -	.43
Cosol 2	gal.	.42 -	.48
Cyclohexane	**lb.**	**.09¾ -**	**.11¾**
Cyclohexanone	lb.	.25 -	.27 •
Diacetone, Pure (dlvd.)	lb.	.12 -	.14½
Dichlorethyl Ether (dms.)	lb.	.15 -	.17
Formal (dms.)	lb.	.29¾ -	.31¾
Dichloropentane (l.c.l.)	lb.	.04 -	.07
Dicom	**gal.**	**.30 -**	**.42**
Dipentene (dms.)	gal.	— -	.60
Halowax Oil	lb.	.38 -	.41
Heptanes (t.c.)	**gal.**	**.17 -**	**.22**
Hexalin Cyclohexanol	**lb.**	**.20 -**	**.22 •**
Hexanes (t.c.)	gal.	.17 -	.22
Isopropyl Alcohol, Ref. 99% (dlvd.)	gal.	.43 -	.60
Ether, Ref. (dlvd.)	gal.	.05 -	.07½
Mesityl Oxide (dlvd.)	lb.	.11½ -	.14
Methyl Acetone, Syn. (dms., dlvd.)	gal.	.54½ -	.72¼
Methyl Ethyl Ketone	lb.	.11 -	.13½
Methyl Isobutyl Ketone (dlvd.)	lb.	.13 -	.15½
N-5 Pentane Mix. (t.c.)	gal.	— -	.13¼
N-6 Hexanes (t.c.)	gal.	— -	.14½
N-7 Hexanes (t.c.)	gal.	— -	.13½
Penetrell	gal.	.44½ -	.68
Petrolene (t.c.)	gal.	— -	.13125
Picolines, Alpha, Refined	lb.	— -	.40
Mixed	lb.	— -	.30
Proprietary Alcohol (t.c.)	gal.	— -	.43½
Pyridine, Refined	lb.	— -	1.05
Quinoline	lb.	— -	.61¼
Rubber Solvent (t.c.)	gal.	— -	.16
Rubsol (t.c.)	gal.	— -	.11875
Skellysolve B (Hexanes) (t.c.)	gal.	— -	.148
C (Heptanes) (t.c.)	gal.	— -	.141
E (Octanes) (t.c.)	**gal.**	**— -**	**.155**
R (Solvent Naphtha)	gal.	— -	.114
Solvenol (dms.)	gal.	— -	.36
Solvent, Crude, Light	gal.	.19 -	.28
Solvesso 100 (t.c.)	**gal.**	**— -**	**.28**
150 (t.c.)	gal.	— -	.28
Sunny South Dipentine	gal.	.44½ -	.68
Sunny South Pine Oil	gal.	.75½ -	.95½
Sunray	gal.	.1140 -	.1600
Toluene (drums)	**gal.**	**— -**	**.28**
Toluol (t.c.)	gal.	— -	.45
Trichlorethane	lb.	.11¼ -	.13½
Trigycol Dichloride (dms.)	lb.	.59½ -	.60½
Union Thinner 1	gal.	— -	.163
3	gal.	— -	.165
5	gal.	— -	.45
7	gal.	— -	.153
2-50-W Hi-Flash	gal.	— -	.41
X-7 Sp. Heptanes (t.c.)	gal.	— -	.11
Xylol	gal.	— -	.45

STABILIZING AGENTS (for Vinyl Resins)

Basic Silicate White Lead	lb.	.1535 -	.1635
No. 201	lb.	.20¼ -	.21¼
Bunatak Polymer No. 780	lb.	— -	.04
No. 5514	lb.	— -	.35
BVS	lb.	— -	.58¾
Cadmium Stearate	**lb.**	**— -**	**1.25**
Dutch Boy DS-207	lb.	— -	.56
Plumb-O-Sil A	lb.	— -	.31¼
B	lb.	— -	.32¾
Trilbase	lb.	— -	.29¼
Dythal	lb.	— -	.42½
Lead Stearate, Precip.	**lb.**	**.36 -**	**.38**
Fused	lb.	— -	.35½
Lithium Stearate	**lb.**	**.63 -**	**.65**
Stabelan E	**lb.**	**1.25 -**	**1.40**
XL	lb.	.55 -	.65
Stabilizer No. 3	lb.	— -	2.15
Stabilizer No. 21	lb.	— -	1.08
Stabilizer No. 52	lb.	— -	2.15
Stabilizer No. 89	lb.	— -	.75
Stabilizer No. 143	lb.	— -	.85
Stabilizer BC-12	lb.	— -	.90
Stabilizer B-5	lb.	— -	.70
Stabilizer CH-14	lb.	— -	.65
Stabilizer E6B	lb.	— -	.95
Stabilizer ICX	lb.	— -	.68
Stabilizer L	lb.	— -	.60
Stabilizer OM-10	lb.	— -	2.15
Stabilizer OM-18	lb.	— -	3.65
Stabilizer SN	lb.	— -	.48
Stabilizer V-1-N	lb.	— -	.45
Stabilizer V-9	lb.	— -	.85
Stabilizer VL-2	lb.	— -	1.27
Stabilizer VL-3	lb.	— -	1.18

STABILIZING AGENTS (Cont'd)

Stabilizer V-7939	**lb.**	**— -**	**.60**
Vanstay L	lb.	.33 -	.35
H	lb.	.75 -	.77
HH	lb.	.98 -	1.00

SUN CHECKING AGENTS

Antisol	lb.	— -	.23
Antisun	lb.	— -	.21
Heliozone	lb.	.26 -	.27
NBC	lb.	— -	1.50
Sharples Wax	**lb.**	**.23 -**	**.28**
Sunolite	**lb.**	**.20 -**	**.23**
Sunproof	**lb.**	**.25 -**	**.26**
Imp.	lb.	.23 -	.24
Jr.	lb.	.18 -	.19
Tonox	lb.	.51½ -	.53½

TACKIFIERS

Arcco 620-32B	lb.	.20 -	.21
716-30	lb.	.19½ -	.20½
1041-21	lb.	.17½ -	.18½
Galex (drums)	lb.	.15½ -	.19¼
Indopol H-300	gal.	1.00 -	1.16
Koresin	**lb.**	**.73 -**	**.75**
Liquid Rubber Flux	lb.	— -	.14
Nilox (c.l.)	cwt.	— -	15.00
Pentalyn A (dlvd.)	lb.	.16 -	.16½
Resin V	**lb.**	**— -**	**.23¼**
Rubtack	**lb.**	**— -**	**.12**
Staybelite Ester No. 10 (dlvd.)	lb.	.24 -	.24½
Synthol	lb.	— -	.24¾
Vistac No. 1	**gal.**	**1.00 -**	**1.16**
A	lb.	.21½ -	.22¼
Zirex (c.l.)	cwt.	— -	15.00

THICKENERS (FOR LATEX)

Alcogum AN-6	**lb.**	**— -**	**.95**
AN-10	lb.	— -	.08¼
Betanol (drums)	**lb.**	**— -**	**.70**
Emulsorex No. 5	**lb.**	**— -**	**.35**
Lecithin	lb.	.12 -	.17
Modicol VD	**lb.**	**— -**	**.12¼**
VE	lb.	— -	.10¾
VF	lb.	— -	.10¾
VK	lb.	— -	.07
Polyco 296	lb.	.15 -	.16
296-N	lb.	.15 -	.16
Propylene Laurate (dms.)	lb.	.57 -	.67
Sodium Silicate	cwt.	1.50 -	2.65

VULCANIZING AGENTS

Selenium

Ancasal*	**lb.**	**— -**	**2.00**
Vandex	lb.	— -	3.50

Sulfur

Blackbird	cwt.	— -	2.30
Crystex	**lb.**	**.19½ -**	**.23**
Darex Dispersed Sulphur	lb.	.12 -	.17
Devil (c.l.)	cwt.	— -	1.75
Dispersed Sulfur	lb.	.12½ -	.14¼
Insoluble Sulfur 60	lb.	.12¼ -	.13
Spider	cwt.	— -	2.30
Star (c.l.)	cwt.	— -	2.25
Tire (c.l.)	**cwt.**	**— -**	**1.75**
Tube	**cwt.**	**— -**	**2.25**
Vultac 2	lb.	.47 -	.49
3	lb.	.51 -	.53

Tellurium

Ancatel*	**lb.**	**— -**	**2.00**
Tellov	lb.	— -	2.50

WETTING AGENTS

Advawet No. 10	lb.	— -	.20
No. 15	lb.	— -	.21½
No. 33	lb.	— -	.48
Aerosol OT 70% Clear	**lb.**	**.80 -**	**1.00**
Alrosol (dms.)	lb.	— -	.40
Alrosperse	lb.	— -	.18
Aquarex D	lb.	— -	.80
MDL Paste	lb.	— -	.33
ME	lb.	— -	.97
NS	**lb.**	**— -**	**.60**
WA Paste	lb.	— -	.28
Areskap 50	lb.	.30 -	.38
Dry 100	lb.	.60 -	.72
Aresket 240	lb.	.30 -	.38
Dry 300	lb.	.60 -	.72
Aresklene 375	lb.	.42 -	.57
Dry 400	lb.	.70 -	.84
Armacs	lb.	.29 -	.76
Arquads	**lb.**	**.21 -**	**.61**
Etho-chemicals	lb.	.34 -	.80
Kessco E-122 (dms.)	lb.	— -	.49
Lecithin	**lb.**	**.18 -**	**.26**
Modicol L	**lb.**	**— -**	**.58**
N	lb.	— -	.40
S	lb.	— -	.32
Nekal NS	lb.	— -	.28
Nopco 1086-A	**lb.**	**.42 -**	**.50**
1187-X	lb.	— -	.14½
Parnol	**lb.**	**.13 -**	**.18**
Santomerse D	lb.	.44 -	.65
S	lb.	.13 -	.25
Sorapon SB	lb.	.14 -	.15
SF Conc.	lb.	.29 -	.30
Sorbit P	lb.	— -	.25
Stablex G	**lb.**	**.50 -**	**.70**
Tergitol 4 (dms., dlvd.)	lb.	.30 -	.31
7 (dms., dlvd.)	lb.	.42 -	.43
08 (dms., dlvd.)	lb.	.30 -	.31
P28 (dms., dlvd.)	lb.	.18½ -	.19
Trenamine W-30	**lb.**	**— -**	**.15**
Vultamol	lb.	— -	.17½
Wetsit Conc.	**lb.**	**.25 -**	**.32**

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GRADUATE CHEMIST: Fifteen years' experience in compounding and all process phases of mechanical goods, cycle tires and tubes, hose, belt, every kind of footwear, proofed goods. Capable complete charge of a plant. Address Box 450-P, RUBBER AGE.

EXECUTIVE CHEMICAL ENGINEER and RUBBER TECHNOLOGIST desires new connection. Proven record as factory manager and technical director. Twenty years' experience all phases of management, research and development, production, engineering design, formulation, compounding, processing, quality control, costs and labor relations. Expert knowledge in compound development, coatings and adhesives, wire and cable, thread, fatty acid production, dispersions, continuous processes and equipment and machine design. Excellent references, numerous patents. Location immaterial. Address Box 433-P, RUBBER AGE.

MECHANICAL ENGINEER desires position with substantial organization. Experience in product development and design of rubber machinery comprises molded, injection molded and calendered products. Special interests: engineered parts for mechanical and automotive application; economizing processes; solving problems. Would welcome proposals in which experience and ingenuity are essential. Age 42. Married. Willing to relocate. Address Box 454-P, RUBBER AGE.

CHEMIST and EXECUTIVE, expert in adhesives. Can take charge of production, research, development, sales engineering. Address Box 453-P, RUBBER AGE.

Executive, Factory Manager, Graduate Chemical Engineer, 25 years' experience compounding, processing rubber, 15 years general management, new plant construction, technical development, desires permanent position of responsibility. Address Box 465-P, RUBBER AGE.

Chemist, expert in latex; also experienced in plastisol and dry rubber wishes laboratory or supervisory position. Address Box 469-P, RUBBER AGE.

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A manufacturer of titanium dioxide is seeking the services of a man with a technical education, approximately 30 years of age, who is interested in selling and who has had some practical experience and background in rubber, as sales representative in the New England area. A real opportunity with an excellent chance for advancement in a nationally known company. Please write, stating age, education, job experience, and salary required. Address Box No. 452-W, c/o Rubber Age.

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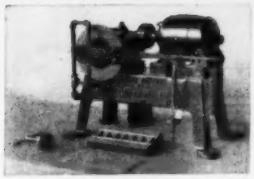

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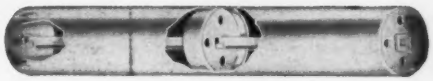

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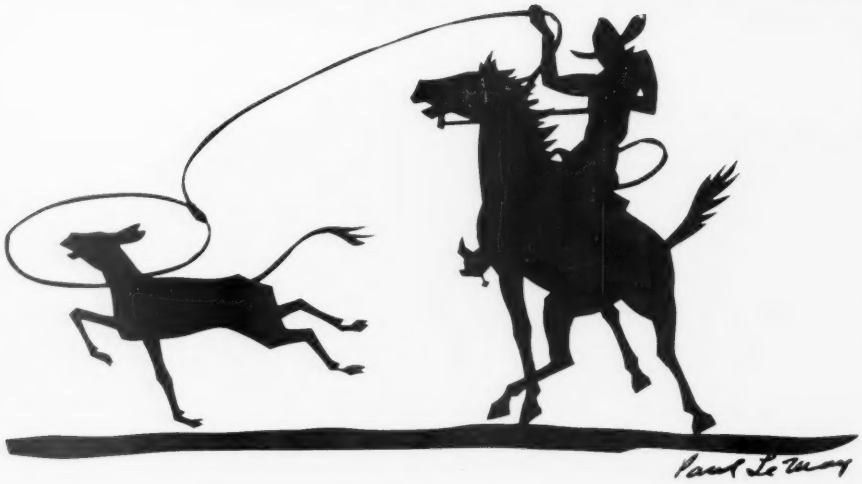

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